RAILROAD GAZETTE

FRIDAY, APRIL 14, 1893.

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Continuous Indicator Cards.

LONDON, March 28, 1893.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have been much interested in the description of the tests on the C., B. & Q. by Mr. Forsyth, but am surprised to read "if it were possible to take a continous indicator card," etc. This is possible. The continuous indicator described some little time ago in your columns (Oct. 14, 1892) will give the work done by a locomotive for any distance, by simple inspection of a dial plate. Such an indicator can be read off at any minute or at any part of the line, so that the power developed between any two points can be ascertained, as well as the total power from start to stop. Such an integrator could be arranged so that readings could be made automatically upon a roll of paper moved by clockwork and there would be shown at once power, time and position, and, if required speed, also could be recorded. But the instrument as it is, without such added refinements, would be amply sufficient to make clear much which is now merely speculative in our knowledge. In the form in which the instrument has been as yet constructed, it is doubtful if it would work with perfect satisfaction at any high rates of revolution, but I think there can be no doubt of the applicability of the principle by experienced instrument makers, who would probably evolve something as different in form as is the modern indicator from the instrument as used by Watt. Until the continuous indicator is employed in conjunction with the drawbar dynamometer, no reliable information can be had on the subject of internal locomotive resistances.

W. B.

Compound Locomotives—Recent Tests.

BOSTON, April 5, 1893.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The recent tests on the Chicago, Burlington & Quincy of various simple and compound locomotives, as described by Mr. Wm. Forsyth in a paper before the Western Railway Club, is likely to create renewed interest in this matter, and as the results are unfavorable to the compounds the broad conclusion will be drawn by many that the compound is not the fuel saver that was anticipated. I shall not notice the performance of the Q compound, because Mr. Forsyth explicitly states that no saving was ever expected from this engine in the service in which it was tested, and because a bad leak was found in the high pressure cylinder caused by cracks in the casting, out of which one or more pieces of iron fell, after the test. It is certainly unfortunate that this engine entered the test, for the result will injure the fame of a class of engine that has made paying savings in hundreds of cases. It is, however, impossible to ignore the failure of the four-cylinder compound, for this was built as a high class test engine for heavy fast service, and was presumably in fine condition.

The purpose of this letter is, however, to make public, for the first time, some results of a test trip with the Dean compound on the Old Colony Railroad with 12 empty day and sleeping cars weighing 384 tons without the locomotive and 476 tons with the locomotive. This train was placed for testing by the Old Colony company on Sunday, May 22, 1892, a previous train of about the same weight having been pulled for a test on Sunday, Nov. 17, 1889, with a new simple engine in fine running order. The weight of the train in the latter case was 376 tons without and 457 tons with the locomotive. The run was from Boston to Providence and return, and, including coal used in banking over one night in each case, the coal used by the simple engine was 7,455 lbs., and for the compound 5,213 lbs., a difference of 2,242 lbs., or 30 per cent.

On the south-bound trip the time occupied was 65¼ minutes for the simple engine, and for the compound 65¾, while the time during which the throttle was open was 61½ minutes for the simple and 57½ minutes for the compound. The average horse power developed south-bound was for the simple engine 690, and for the compound 745, so that whether the weights of trains, or times while throttles were open, or powers developed be considered, the compound did the hardest work. In order to see just how she did this work, the steam pressures and powers are given for every two minutes, south-bound:

Gauge pressures every two minutes. Lbs.	Horse powers.
185	753.6
183	777.2
177	737.4
183	875.0
178	702.7
183	642.1
183	739.6
180	742.6
175	733.9
181	770.5
180	817.6
180	755.5
180	936.8
181	537.5
180	817.4
178	802.2
171	693.9
167	732.4
177	732.7
172	753.1
177	745 2
177	717.0
170	628 6
165	613.4
177	847.4
Average	745.0

The amounts of feedwater used were as follows:

Engine.	Total water.	Water per hour per horse power.
Simple, south	19,340 lbs.	27.4 lbs.
Compound, south	13,416 "	18.8 "

This shows a saving of 8.6 lbs. of water, or 31.4 per cent. The above 18.8 lbs is without doubt the lowest amount of water ever used by a single valve compound, non-condensing engine, while that used by the simple engine is probably as good as is likely to be obtained from a single valve simple engine, and both amounts include some steam blown off at Mansfield.

The northbound trip of the compound has not yet been worked up, but that it was highly economical may be judged from the total water quantities of the two engines which were 19,312 lbs. and 14,940 lbs. It would have been less still for the compound if the steam pressure had not fallen so that the required cut-off was later than would otherwise have been the case for a portion of the way.

Now, it seems to me that if a compound locomotive can, when running at an average speed of 40 miles an hour, with any kind of a train, use as little feedwater as 18.8 lbs., it is entirely unreasonable to suppose that there are any conditions under which it can use more coal or water than a simple engine. This trip can be compared with the Q 19 in. × 24 in. mogul when pulling 12 cars weighing 386 tons and using 34.3 lbs. of water per dynamometer horse power per hour. Mr. Forsyth says that the car horse power is 73.6 per cent. of the total indicated; applying which to the above 34.3 lbs. would make the feedwater used per indicated horse power per hour 25.24 lbs. This is evidently lower than any simple engine can work on, but even if it be accepted, the Old Colony compound saved 25½ per cent. of water compared with it. As evidence that the above 25½ lbs. is too little for a simple locomotive, it may here be stated that the Corliss engines at the Cincinnati Exhibition used an average of 24.9 lbs.

F. W. DEAN.

Misuse and Diversion of Cars.

A meeting of car accountants and other gentlemen interested in car service was held in Philadelphia April 8. The meeting was called by the car accountants of the railroads centering in New York, Messrs. Wheatly, of the West Shore; Ewings, of the New York Central; Higbie, of the Central Railroad of New Jersey; Cooke, of the Erie, and Haff, of the Long Island Railroad; being on the committee. Several of the committees of the International Association of Car Accountants had met at the Hotel Metropole on the previous day and on the morning of Saturday and the members of these committees formed the nucleus of the meeting, which was also attended by most of the car accountants of the Eastern and New England railroads and a number of managers of car service associations.

Beside the gentlemen named above there were present Mr. Oborne, of the Canadian Pacific, who acted as Chairman; Mr. Sechrist, of the *Equipment Guide*, who acted as Secretary; Messrs. Parke, of the East Tennessee, Virginia & Georgia; Hale and Freeman, of the Pennsylvania Railroad; Rupp, of the Allegheny Valley; Robertson, of the Nickel Plate; Stager and Cole, of the Reading & Lehigh Valley; Terbell, of the Fall Brook; Brennan, of the Buffalo, Rochester & Pittsburgh; Burnham, of the Fitchburg; Sipp, of the Chesapeake & Ohio; Wheeler, of the Lake Shore; Rosevear, of the Grand Trunk; Currier, of the Old Colony; Magiff, of the Central Vermont; Cavanagh, of the Big Four; Hobbs, of the Boston & Maine, and other car accountants. The private car lines were represented by Messrs. Penfold, of the Merchants' Despatch Transportation, and Payne, of the Union Tank Line, and the car service associations were represented by Messrs. Halsey, of the Buffalo; Simmons, of the Cleveland; Morse, of the New York, and Gardner, of the Buffalo association.

There was a similar meeting last year at the Astor House, where most of the discussion was on the per diem question. The work of this meeting was confined to the discussion of the "Rules to Prevent the Misuse and Diversion of Cars," which were proposed at a similar informal meeting of car accountants at Chicago last February and were adopted with amendments by the American Railway Association, but which have not, so far as we are aware, been formally accepted by any railroad. It was noticeable at the meeting that the discussion of these rules rather dragged, and that many of the gentlemen present, and especially those from some of the larger railroads, seemed to feel an indisposition toward even discussing the question of diversion. Indeed, the representatives of the Erie and the Pennsylvania were most emphatic in stating that, while rules for the regulation and prevention of diversion might be a good thing if per diem were adopted, there was no particular use in them under present circumstances. The meeting, however, went ahead discussing the rules, and amendments were moved, discussed and carried through, although it was understood at the outset that no action on any resolutions which were passed would be taken, and the meeting was really only for an exchange of views as a preliminary to the June meeting of the Car Accountants' Association.

The unwritten law which is supposed to govern the interchange of freight cars demands that after a car has reached its destination on a foreign railroad and has been unloaded, it shall be at once sent home either loaded or empty, but that it must not be moved out of the homeward route. The first of these 'Rules" permits the sending of cars in a direction opposite to their home road in order to secure a home load. There is absolutely no restriction in the "Rules" to the distance the car may be sent for the home load or the time that may be consumed in such a movement. The sense of Saturday's meeting was that when a car is thus sent out of route to secure a load homeward, the load homeward must be secured in a "reasonable time," whether it is secured on the road sending it out of route or on a foreign road; and furthermore the load homeward, if it does not take it all the way home, must, at least, take it beyond the territory of the railroad sending it out of route, and that on its homeward way.

The second of these "Rules" provides that when a car is loaded over several roads, either one of those roads may demand its return the same way. Of course, if no load is offered for the car, the lines which have hauled it loaded may be compelled to accept it empty, and this rule was intended to compensate them in some way for this empty haul by enabling them to call for it if it is needed for a load home, but Saturday's meeting was of opinion that the terminal road might load the car home by any route.

The "Rules" as originally adopted do not mention "switch cars," and Saturday's meeting so modified the third of the rules as to recognize the right on the part of any railroad to demand the return of cars which it has delivered to another for a "switch movement."

The fifth of these "Rules" establishes a penalty of one dollar for the diversion of a car, that is, for the loading it to another railroad out of route. Saturday's meeting raised this penalty to $5 and proposed that disputes arising from the enforcement of this penalty should be referred to the car service committee of the American Railway Association, or such committee as they might appoint.

The great success of the Arbitration Committee of the Master Car Builders' Association in settling disputes as to repairs would seem to point to the possibility that an arbitration committee might do good work in settling diversion disputes. It is easy to understand, however, that the Association of Car Accountants is somewhat backward in proposing to appoint an arbitration committee, as there are still many car accountants who do not "handle" their equipment, and this proposal to leave the appointment of the committee with the Car Service Committee of the American Railway Association seems, therefore, very proper.

The other rules were not amended in any way except the last, which has caused a great deal of discussion, and which, it appears, was not correctly drafted. The rule reads as follows: "Foreign cars may be loaded with transferable commodities consigned to any road at a junction point common with the road that owns the cars, and on arrival at such common junction point contents will be transferred and the car returned to delivering road or to owners at the option of the road transferring the cars. If cars, loaded as above mentioned, are not transferred, the line responsible for making transfer will be liable for diverting cars, except as provided in Rule 6." It now appears that it should read: "Foreign cars may be loaded with transferable commodities consigned to any road at *the nearest junction point* common, etc." With this change it seems that there is no objection to the rule, although as it stands it would appear to permit a great deal of indiscriminate diversion.

After the meeting adjourned the gentlemen met upstairs at dinner, after which there were speeches by members of the committee, officers of the Car Service associations and others. The conclusion of such meetings by a dinner is a practice borrowed from the Eastern Car Service Association.

Passenger Locomotive—Class "Y."

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS RAILWAY.

[*With an Inset.*]

The illustrations with this show an interesting locomotive known as the class "Y" of the Chicago, Cleveland, Cincinnati & St. Louis Railway, designed by Mr. E. P. Lord, Superintendent of Motive Power, and built by the Schenectady Locomotive Works. The late Mr. G. J. Worthington was Mechanical Engineer of the railroad company when the designs were made. The following table gives the general dimensions of the locomotive:

Gauge	4 ft. 8½ in.
Cylinders	18½ in. diam. by 24 in. stroke.
Driving wheels, diameter	68 in.
Wheel base, rigid	7 ft. 9 in.
" " total	22 ft. 8½ in.
Weight, on drivers	86,500 lbs.
" " truck	42,780 lbs.
" " total	129,280 lbs.
Tubes, outside diameter	2 in.
" number	241
Tubes, length between tube sheets	11 ft. 4 in.
Tubes, thickness	No. 10 B. W. G.
Heating surface, firebox	143.74 sq. ft.
" " tubes	1,426.28 sq. ft.
" " total	1,570.02 sq. ft.
Grate surface	31.3 sq. ft.
Boiler pressure	180 lbs. per sq. in.
Exhaust nozzle, diameter	4½ in.
Valve travel	5⅝ in.
" outside lap	1⅛ in.
" inside lap	0
" lead	⅛ in
Throw of eccentric	2¾ in.
Steam ports, length	23 in.
" " width	1¼ in.
Exhaust port, length	23 in.
" " width	2½ in.
Boiler diameter, maximum	60 in.
" " minimum	59 in.
Journals, driving	8½ in. diam. 10½ in. long.
" engine truck	5¾ in. diam. 10 in. long.
" tender truck	4¼ in. diam, 8 in. long.
Tank, capacity	4,000 gallons.
Coalbox, capacity	7 tons.
Weight of tender, loaded	85,280 lbs.

The side elevation, fig. 1, shows the general arrangement of the parts and more or less of the details—the more interesting details are given in separate illustrations; fig. 2 shows the boiler; fig. 3 the method of under hung spring support; and other very interesting details are shown in figs. 4, 5, 6 and 7.

One of the most striking features of the design is the arrangement of the springs and equalizers beneath the journal boxes, shown in detail in fig. 3. It will be seen that a spacer is placed between the two members of the frame where the load is transferred to the equalizer. This spacer also carries the brake hanger. The bearing surface on the equalizer is of steel dovetailed into the iron bar, as are also the two end bearings for the hangers. The driving springs are supported from the under side of the boxes by means of a hanger, shown in fig. 5, which is hung from a straight pin that passes through the two jaws of the box and the hanger. The spring hangers pass through the ends of the springs and the ends of the equalizers. The whole is well tied together at "A," "A" and "B," fig 3, by cross braces shown in detail in fig. 6. This is an excellent design of under hanging spring support.

The boiler is interesting on account of the arrangement and design of stays, location of wash-out plugs and other features. Referring to fig. 2, it will be seen that the back head and other parts are well stayed with unusually large stays and more of them than are generally used. The attachment of the short diagonal stays to the back head is novel in that the angle or tee iron, usually riveted to the back head, is replaced by short wide plates, of which the ends are bent up and the ends of adjacent ones butted together. Also worthy of notice is the method adopted of passing the cross stays above the crown sheet, past the diagonal stays, where the two would interfere were the cross stays extended directly across the boiler. This is done by using a short rod on each side, extending nearly to the diagonal stays. To this rod is attached an equalizer, held with a pin connection, and from this is a rod extending across to the equalizer on the other side, one rod above and one below the diagonal stay. The back head, where not stayed with screw stays through the firebox, is reinforced by diagonal stays to the side sheets. The front tube sheet is stiffened with an iron bar 4 in. by 2½ in. riveted to the sheet just above the top row of tubes. The space between the firebox sheets and side sheets, especially toward the top, is greater than is generally allowed. This is obtained by contracting the firebox from a point about 19 in. back of the tube sheet to the back end, the front end being left wider to give a wide tube sheet.

The back end of the boiler is supported by a plate riveted to the back sheet and which lips over the foot plate. The back sheet is reinforced on the inside where these expansion plates are riveted on. Another plate supporting is fasted to the throat sheet with studs, and by means of it the weight at the front end of the firebox is carried to a crosstie between the frames. The frame pads are used solely to prevent side motion of the boiler. The mud ring, or firebox ring, is of hammered iron and is planed on both sides so that the plates fit it closely and make a tight joint. Another interesting feature is the design of staybolts used in the forward top corner of the side sheet. They are threaded into the firebox side sheet and riveted over, but in the outside side sheet they are held with nut and swivel joint to allow for contraction and expansion, as it has been found that the staybolts in that place break most frequently. This we will illustrate in detail. It will be observed that the boiler has a large number of good sized washout plugs, and they are very conveniently placed, being easy to get at on the outside and arranged to facilitate reaching parts inside the boiler that are to be cleaned frequently.

The side elevation, fig. 1, shows other interesting arrangements. The frame is offset downward back of the forward driving box to allow a deeper firebox than could otherwise be used. The frame is also thickened at the jaws, being 5½ in. at these places and 4 in. at all others. This is to give greater wearing surface for the wedges. The journals are large, 8½ in. × 10½ in., and in fact, all the wearing surfaces have liberal dimensions, and are in accordance with the best modern practice.

The design of crosshead is a departure from ordinary practice, as the outside wings are bolted to the cross head, so that when lining up it is only necessary to remove the eight nuts, slip off the wings and insert the liners.

The steam ports are 23 in. long and the valve travel 5⅝ in. These long ports are designed to better the steam admission, and it will be interesting to see indicator cards from these engines.

The lift shaft is 2½ in. in diameter at the bearing and 3¼ in. in diameter throughout the body of shaft. The rocker arm is 4 in. in diameter and the bearing is 14½ in. long; the pins in each arm are 1⅝ in. in diameter and taper ⅛ in. in 12 in. The bearings in the link hangers are bushed with steel $\frac{3}{16}$ in. thick; these bushings are held in place by a ⅛ in. steel pin at each end of the bushing driven in a hole drilled ¾ in. deep, half in the bushing and half in the hanger; the pin is driven in $\frac{1}{16}$ in. below the face of the hanger, and the edges of the hanger around the hole are burred over to prevent the pin from working out. The eccentric rods are 1 in. thick by 2⅛ in. wide at the outer ends and 4 in. at the inner ends. The reach rod is ⅞ by 3 in.

The link is 3 in. wide, thus giving liberal wearing surface to correspond with other parts. The valve gear was designed to give a constant lead at all points of cut off; how nearly this was obtained is shown in the following table:

Cut-off.		Valve opens.		Lead.	
Front Stroke.	Back stroke.	Front stroke.	Back stroke.	Front stroke.	Back stroke.
19¾	20	$\frac{15}{16}$	$\frac{15}{16}$	$\frac{1}{16}$	$\frac{1}{16}$
18	18⅛	$1\frac{1}{16}$	$1\frac{1}{32}$	$\frac{3}{32}$	$\frac{3}{32}$
16	16⅛	$\frac{31}{32}$	$\frac{31}{32}$	$\frac{3}{32}$	$\frac{3}{32}$
14	14¼	$\frac{7}{8}$	$\frac{31}{32}$	$\frac{1}{16}$	$\frac{1}{16}$
12	12	$\frac{13}{16}$	$\frac{15}{16}$	$\frac{1}{16}$	$\frac{1}{16}$
10	10	$\frac{3}{4}$	$\frac{13}{16}$	$\frac{1}{16}$	$\frac{1}{16}$
8	8	$\frac{11}{16}$	$\frac{3}{4}$	$\frac{1}{16}$	$\frac{1}{16}$

This nearly constant lead has been gained by setting the back gear eccentric so that there is a negative lead in back gear; that is, the back motion has no lead and in fact the valve does not open until the crank has passed the dead centre.

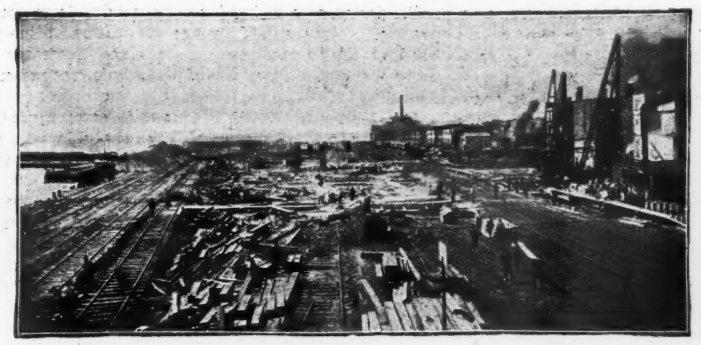
The stack is lined with a sheet steel lining, conical shape, with the smallest diameter about 8 in. above the base of the stack.

The deck on the cab roof is another novelty, and one that is worthy of consideration, as it is conducive to good ventilation, especially in stormy weather, without exposing the crew or the machinery inside the cab to the wind and rain.

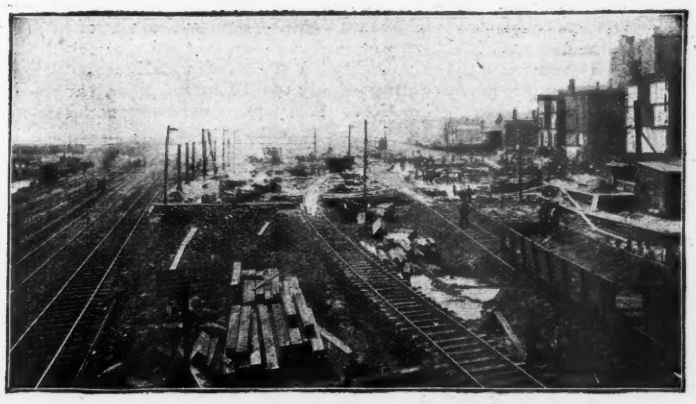
There are other arrangements about the locomotive that indicate that the minor details have received much consideration. Some of these are more clearly shown in the half-tone illustration. The step on the front bumper, and one on each end of the tender, and also on one side of the boiler, just above the injector pipe, illustrate this point. The step above the injector pipe facilitates getting to the sand-box and dome, and protects the injector pipe from injury by being used as a step, as is customary.

The tender, and more of the details of the locomotive, will be illustrated in succeeding numbers of the *Railroad Gazette.*

PASSENGER LOCOMOTIVE, CLASS "Y"—CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS RAILWAY.

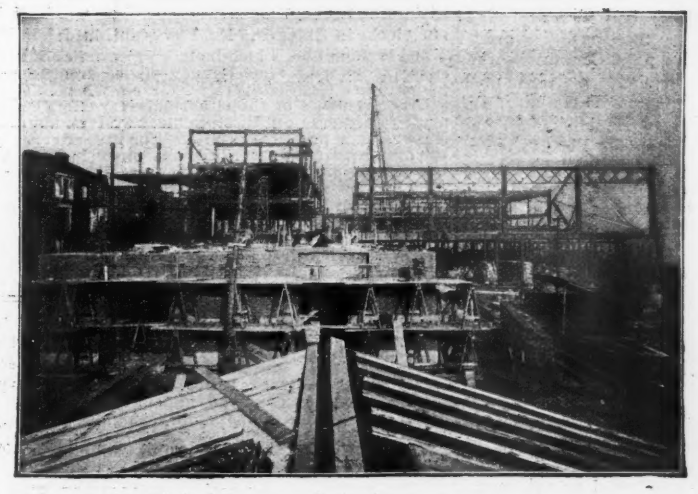


August 15, 1892.



September 15, 1892.

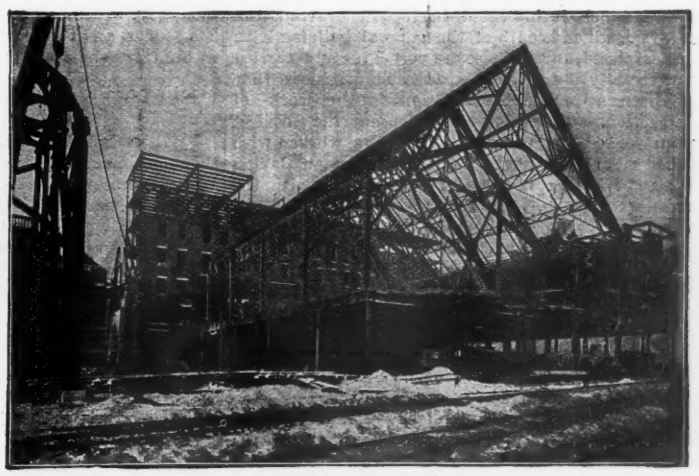
November 15, 1892.



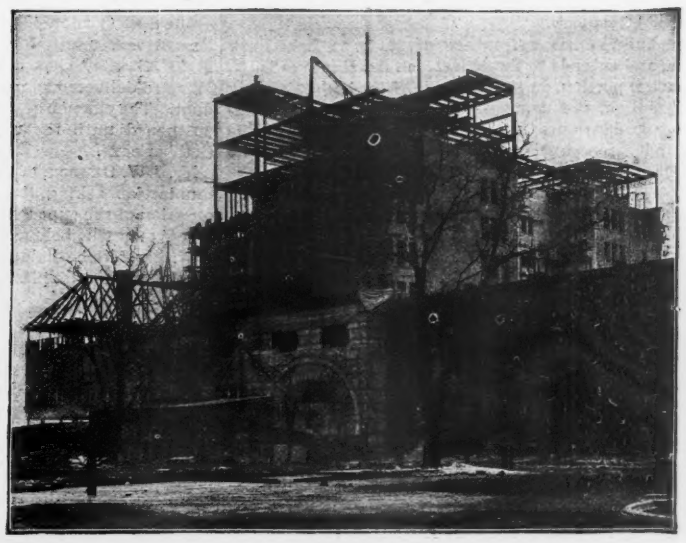
December 15, 1892.

FROM PHOTOGRAPHS SHOWING THE PROGRESS OF THE WORK ON THE CENTRAL STATION OF THE ILLINOIS CENTRAL RAILROAD.

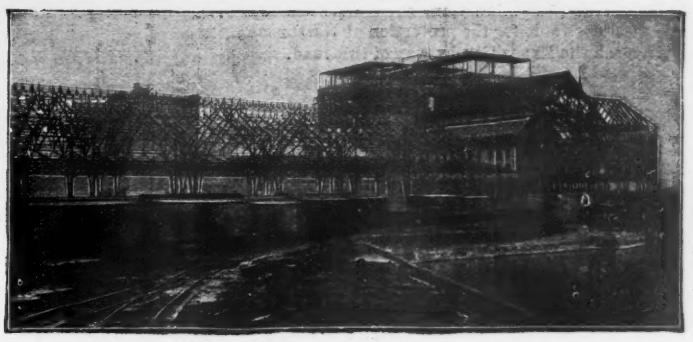
BRADFORD L. GILBERT, *Architect.* JOHN F. WALLACE, *Chief Engineer.*



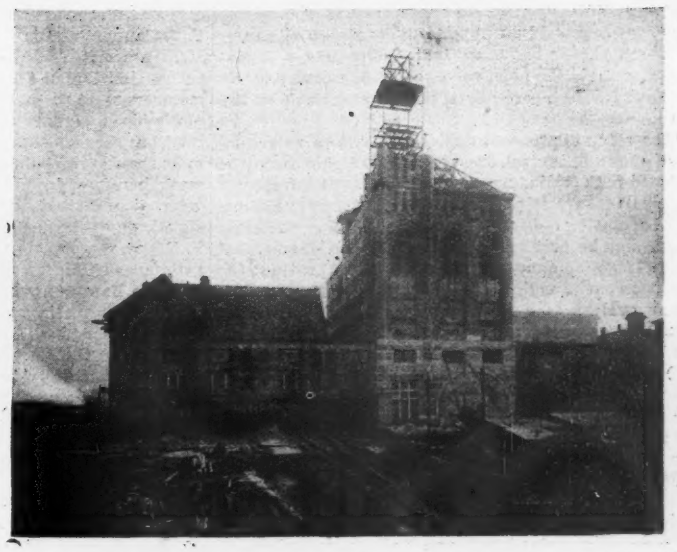
January 15, 1893.



February 15, 1893.



February 15, 1893.



March 15, 1893.

The Central Station of the Illinois Central Railroad.

In our issue of Oct. 14, 1892, there appeared a description with many illustrations of the new Central Station building of the Illinois Central Railroad at Park Row and Twelfth street, Chicago. The engravings which are shown in this issue, taken from photographs, illustrate the remarkable progress that has been made in that work. The architect, Mr. B. L. Gilbert, says that he knows of no building in Chicago which has been carried forward more rapidly under such difficulties. Ground was broken June 4, 1892. Over two thousand hardwood piles were driven an average of 60 ft. in length, carrying the entire weight of the structure on initial points, varying from 15 to 750 tons weight on the piers. The last pile was driven Sept. 8, the oak planking and wales for subways and cellar below city datum being finished the last of October, the filled ground being almost impossible to excavate on account of riprap and old cribwork. The erection of the ironwork was begun in October and the building will be open for use April 17. The photographs from which the engravings were made were taken during the progress of the work at various dates from Aug. 15 to March 15. Besides

the work which is indicated in these engravings the subways north and south of the general building have been completed, and as these are very large and carried below the city datum for considerable distances they have been a formidable addition to the work of construction. The winter has been the coldest known for 40 years, and the men have worked with an open salamander at the beck of each man, laying brick and putting in place the ironwork with the thermometer 15 deg. below zero; and this low temperature was not encountered one day merely, but day after day. On April 6 the tower was finished, the tiling on all the roofs and the plastering were well advanced, the main rotunda and all the lower portion of the building completed and the mosaic floors and marble work also finished, so that the main rooms can, without question, be thrown open for public use as proposed on April 17. Two bronze tablets have been cast, which will be placed on either side of the main columns of the entrance stairway, secured to the granite plinths. One tablet will contain the dates of beginning and opening the building and the names of the Chief Engineer, Mr. Wallace; the Architect, Mr. Gilbert, and the General Contractor, Mr. Downey. On the other tablet will be inscribed the names of the directors and officers of the Illinois Central Railroad Company.

The building has a frontage of 220 ft. on Lake Park place, and extends to Twelfth street, a distance of 180 ft. The office portion, on the west side of the building, is six stories high, the depot portion being but two stories high. A departure from the ordinary construction is the underground passages across the tracks so that the passengers will have no occasion to cross the tracks themselves. The building will cost about $1,500,000, the foundations being the most expensive part.

This station will be used at once for the through trains of the Illinois Central, the Michigan Central, the Cleveland, Cincinnati, Chicago & St. Louis, and the Chicago & West Michigan. These roads will then have facilities in Chicago second to those of no other road.

It may be of interest to add here that the Illinois Central is making every possible arrangement at Chicago to protect itself from loss of fares and its patrons from injury during the World's Fair period. It is preparing to inclose its right of way between the city and Jackson Park with an iron fence, five feet high, with gates only at the various stations, where each one passing through will be required to show a ticket. Passengers for suburban trains will be required to pay before getting on the train. It is expected that this arrangement will be very inconvenient for those who have property between the railroad and the lake, such as the several boat clubs, but aside from such objections the fence is most desirable for the protection of the throngs who will reach the Exposition by way of this road.

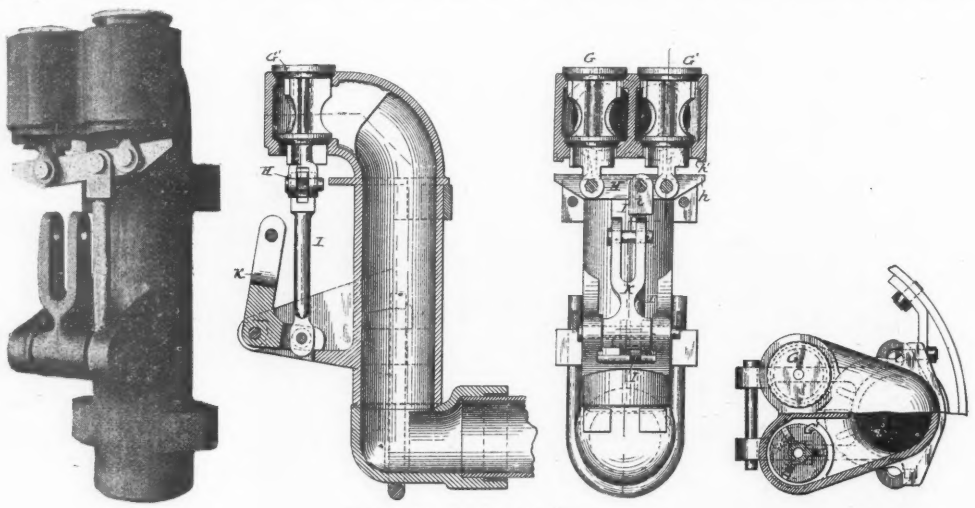
A New Double Throttle Valve.

Mr. A. J. Pitkin, Superintendent of the Schenectady Locomotive Works, has just received a patent for a simple and ingenious throttle valve which is shown in the engravings. The perspective view is from a photograph showing the double throttle with one valve open and one closed. The arrangement of parts is clearly shown in the sectional views and half plan. The reasons which have led to this device, and the purposes which it is proposed to accomplish, are clearly stated in the following extracts from the patent specifications.

"On large engines in order to supply sufficient steam to the cylinders, a very large valve has been employed, and much difficulty has been encountered in opening the valve, on account of the outside steam pressure, and it is difficult to keep the valve tight, owing to the expansion of metal in the pipe, valve seat and valve, and by reason of the high pressure on the large surface of the valve.

"According to my invention, I employ two valves instead of one to control the passage of steam from the dome to both cylinders of the engine, and I operate these valves successively or dissimultaneously by a single set of operating rods and levers, in order that sufficient steam may be first admitted to start the engine, and then a larger amount of steam admitted to continue the operation of the engine at high speed. By thus employing two valves, each of them may be smaller than the single large valve usually employed, but their total area is greater, so that steam is supplied to the connecting pipe to its full capacity, and the reduced size of each valve insures less tendency to leakage or expansion of metals."

The bell crank K is connected to the throttle lever in the cab. The valves themselves, G and G', may be of the usual design. Both valve chambers communicate, as shown, with the dry pipe, and the valves admit steam from the dome into the valve chambers at both top and bottom. Each valve is connected with the crosshead H, and this in turn by the link I to the bell crank. It will be observed that the connection of the link to the crosshead is nearer to the connection of one valve than to that of the other; or, as shown in the sectional elevation, it is nearer to valve G' than to valve G. It follows that when the bell crank is first moved the valve G' will be opened without opening G. Enough steam is admitted to start the engine, and steam is also admitted to the inside of G and balances it. As the movement of the bell crank continues the end h of the crosshead H abuts against the lug h', which acts as a fulcrum on which the crosshead turns, and thus the valve G is opened admitting steam through both G and G'.



Pitkin's Double Throttle Valve.

Meeting of the American Society of Railroad Superintendents.

This society held a meeting in Chicago on Monday of this week, in accordance with the call recently issued by the Secretary, it having been deemed advisable to follow the example of the American Railway Association in holding a spring meeting in the West. The result was not very encouraging, however, only 25 members being in attendance.

The meeting was called to order by the Second Vice-President, Mr. C. H. Platt, General Manager of the New York, New Haven & Hartford, who presided throughout the session. The first business was the election of 52 new members. This large accession, like the accessions at previous meetings, came from all parts of the country, 20 different states being represented. From this and from the fact that the Treasurer has on hand a surplus of $2,000 it appears that the superintendents of the country are quite ready to support this association with the sinews of war, whatever may be said about the more important feature of personal participation in its work.

The Society adopted the resolutions drawn up by the Executive Committee on the death of the late President, Mr. H. Stanley Goodwin, and Messrs. Platt, Sully and Morford delivered short eulogies on the deceased President. The election of a successor to Mr. Goodwin was postponed until the regular meeting, which comes in October next.

Mr. J. W. Dawson, of the Kanawha & Ohio, sent a communication asking the Society to take action on the question of the expediency of appointing to responsible places men who belong to secret brotherhoods and who may therefore be liable to be actuated by prejudice in administering discipline. This communication was referred to the Executive Committee. Mr. Dawson also sent a communication setting forth the need of a committee to introduce ordinary members to the "railroad magnates" whom he finds at the meetings. The meeting recognized the need of a Reception Committee and authorized the Chairman to appoint one. He named Major R. M. Sully, of the Richmond & Petersburg; Mr. F. S. Gannon, of the Staten Island Rapid Transit, and Mr. Waterman Stone, of the Kansas City Elevated.

The Hall Signal Company sent a letter inviting the members to go by special train to inspect the Hall automatic block signals on the Chicago & Northwestern road, but the members could not agree upon a time when more than a few could go in a body, and the invitation was therefore declined with regrets. The members were also invited to inspect the Mozier semaphore signal, on exhibition in the Grand Pacific Hotel. Mr. H. F. Royce, representing the Reception Committee of the railroads of Chicago, invited the members to visit the World's Fair grounds on either Tuesday or Thursday afternoon, a special train being tendered by the Illinois Central. This invitation was accepted, and a party of 75 went on the excursion, including members of the American Railway Association.

The afternoon was given up to discussion on signaling practice. Mr. C. H. Platt described the method by which the New York, New Haven & Hartford protects outlying switches by connecting them to the Sykes locking apparatus. This device, as heretofore noted in the *Railroad Gazette*, has been applied on the New London Division of this road to all side tracks located away from towers. Each switch lever for such a side track is in a small cabin and its lock is electrically connected by a circuit extending from the tower on the east to the tower on the west. A conductor who wishes to use such a side track enters the cabin at the switch and notifies the operator at the tower in the rear by a bell code, who then unlocks the switch; the train then backs in and after backing it has backed over a derailing switch, fixed beyond the fouling point, the conductor resets the main switch and permits the operator at the tower to admit a following train. It is mechanically impossible to give this permission until the derailing switch has been set and the other operations performed in proper order.

Mr. Wrenne, of the Nashville, Chattanooga & St. Louis, gave a brief description of his method of running a large number of trains on a six-mile stretch of single track between Chattanooga and Wauhatchie, where his road is used by the trains of the Cincinnati, New Orleans & Texas Pacific, and of the Memphis & Charleston. This piece of road is divided into two-mile sections and the men in the towers not only operate the block system, but, under the direction of a despatcher or chief operator, give all meeting orders to the train by means of the outdoor signals, no written orders being issued. Orders for slow trains to make way for faster trains are also given entirely by the outdoor signals. This plan is similar to that in use on the Louisville bridge for several years.

This subject was next taken up by Mr. C. H. Platt, who, as our readers will remember, was formerly General Manager of the Grand Central station in New York City, who read an interesting paper, principally devoted to a description of the very elaborate block signal apparatus recently applied in the Fourth avenue tunnel, New York. This paper we print in another column.

The Block Signals in the Fourth Avenue Tunnel.*

Mr. Platt began with a short historical sketch of block signaling, referring to the original patents of Mr. Sykes (England 1875, United States 1881), and Sykes' improvement (patented in 1880 and 1881), by which the plunger was added, enabling station B to not only lock A, but to lock his own lever by the act of plunging. The improved Sykes instruments were placed on the signals in the tunnel in 1882, the track circuit being put in (just beyond each tower) instead of the track lever, designed by Sykes, because it was by this means possible to provide against a signal being cleared by the front portion of a train, while a large part of the train might still be within the section. This was the first application of such locks in America. Mr. Platt continued:

The Harlem line, which includes two miles of tunnel, runs trains with almost unparalleled frequency and under difficulties that rarely exist elsewhere. To meet the requirements of the situation every effort has been made to preserve an absolute block system, not only in theory but in practical results. The first advance from the system already described was made in 1888, by the use of locks changed in some parts of their mechanical construction so that the signal levers are not locked in the clear position as in the case with the imported instruments; and, by the substitution of electro-magnets for controlling the locks, in place of the permanent or horseshoe magnets, which were found to vary greatly from time to time in the amount of force exerted; also by replacing the short releasing circuits, with rail circuits extending from tower to tower, thus providing against the possibility of operators clearing signals at the entrance of any block when any portion of the preceding train remained in the block, although the forward part of the train had passed out, and performed its part in "unlocking" at the advance tower. This change was found especially desirable in the tunnel on account of the difficulty, not to say impossibility, at times of operators seeing the tail lights or markers of passing trains, and knowing that *all* of the train had cleared. The track circuit was new only in its application to the Sykes system; it had before been used in connection with purely automatic signals. The advantage of this system is in the inability of the operator to clear the signals governing any block when: (a) a car, a single pair of wheels, or any metallic obstruction, reaching from rail to rail, is in the block; (b) when any switch in block is not properly closed; (c) when cars standing on sidings do not clear the fouling point with main line; (d) when a rail is broken, if ends are separated even $\frac{1}{100}$ in. Subsequently audible signals, both torpedo and gong, were attached to such visual home signals as are located in the tunnel and made to work in harmony with them.

With these improvements the development of block signals has reached nearly to theoretical perfection. The various appliances thus far mentioned call for large expenditures, very close and frequent inspections and the overcoming of many difficulties not at first apparent. The ordinary conditions prevailing in tunnels are decidedly adverse to the easy maintenance of track cir-

* A paper read by Mr. C. H. Platt, before the meeting of the American Society of Railroad Superintendents at Chicago April 10, 1893.

cuits and necessary connections in perfect working order. It may be said, however, that any defect or failure in the working of the track circuit serves to delay rather than to endanger traffic.

When we have reached a point in an absolute block system where the danger from wrong action on the part of operators is entirely eliminated; where the automatic appliances are limited to the uses necessary to accomplish that object, and so arranged that any failure on their part will always be on the side of safety, we have only to provide for the occasional failure sure to result from the use of automatic attachments, especially under favorable conditions of location, climate, etc. The present field for improvements, therefore, seems to be confined to changes in the cabinets, locks and connections, to limit the possible failures, even under unfavorable conditions, and to provide for the prompt and safe movement of trains when such failures do occur. The necessity for the *prompt* movement of trains on the Harlem line at all times will be apparent when the fact is stated that the record shows a movement of 412 trains over the line [four tracks] in 12 hours, averaging one train in every one and three-quarter minutes for the entire time mentioned.

There is one theoretical, if not practical, defect in the Sykes lock exclusively used in Europe, and until the present year, in this country also, namely, gravity assists in withdrawing the lock rod from the "locked" position when allowed to do so by the action of the electric current which is within the control of the operator at the advance tower, *after* the passage of the train for which the signals were previously cleared, and which is used by him to unlock the levers in the rear tower. While no accidents have been reported as resulting from this defect, it is true that gravity has at various times overcome the magnetic force or mechanical arrangement holding the lock rod in place and caused it to drop or unlock when the block it controlled was occupied. Again, when an electric current reaches and demagnetizes the magnets holding the lock rod in the locked position, the lock is released whether the current performing the work is the regular one under the control of the advance tower operator, or an accidental one arising from crossing of wires, lightning or other cause.

But in view of the desire of the management to provide every possible safeguard Mr. Platt, in 1891, formulated a plan much more elaborate than anything heretofore attempted in the signaling line on any railroad in the world, and the main features of this plan, which have been met and carried out by the Johnson Railroad Signal Company, were described as follows:

The new system provides :

1. Every safeguard in use in the old system is retained and works in harmony with the improved plan.

2. Cabinets and locks are constructed on an entirely new principle, and so arranged that gravity must be overcome by the action of the electric current to unlock the signal levers, instead of allowing gravity to act, as heretofore.

3. The magnets used for unlocking at the rear tower are not in the lock circuit, except at the moment of actual use, thereby eliminating the possible danger from accidental currents.

4. An independent and direct wire circuit, in connection with supplemental cabinets, unlocks a caution signal lever in the rear tower of each block, and enables the operator there to withdraw the audible signals and give a visual caution signal, after the preceding train has passed out of the section, and when the white or clear signal cannot be shown because of defect in, or non-action of, the track circuit. This secondary or caution signal cannot be used until the train for which the signals were last cleared has passed over a track instrument lever beyond the advance tower of the block, and then only by the concurrent action of the operators at the advance and rear towers. The primary or track circuit system and the secondary or direct wire system do not conflict in any way with each other. The use of the direct wire circuit does not prevent the use of the track circuit for the next train if that current is again effective. But one system can be effectively used for any one train and the restoration of either lever to the blocked position restores both systems to normal conditions.

The object of this seemingly complicated but really simple device will at once be seen to provide for the use of the track circuit, with every protection it can give, whenever the conditions will permit of its use; and for the immediate use of the so-called Sykes system, with the improvements described, but without the track circuit, whenever that may fail. The green signal is used with the direct wire circuit for the reason that the failure of the track circuit may be on account of a broken rail or a temporary obstruction of the track.

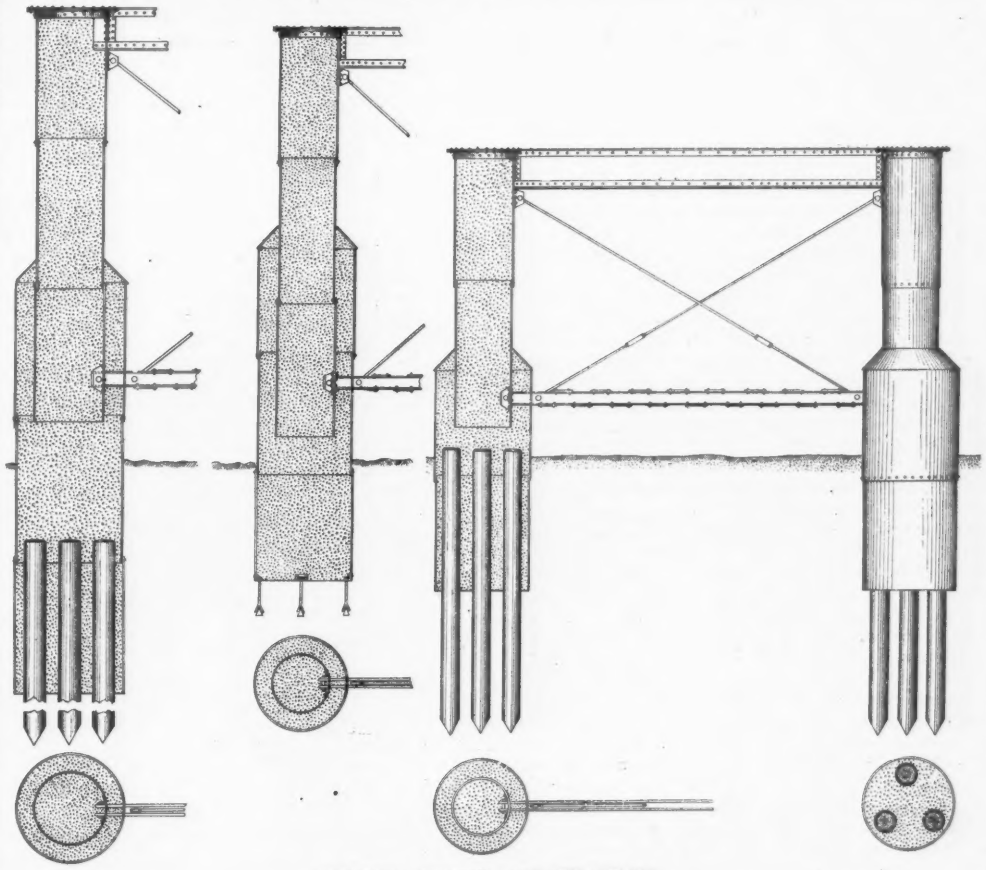
The plan also provides (*a*) For the overlapping of each block a safe distance beyond the home signal; (*b*) that all visual signals assume the danger position automatically when the train for which they were cleared passes them; (*c*) that the audible signals do not assume the danger position automatically; (*d*) that the gong signals may be put to danger at any time by the operator; during the passage of a train if necessary; (*e*) that the torpedo exploders cannot be restored during the passage of a train, but can be at all other times; (*f*) that both torpedo and gong signals work in perfect harmony with visual signals except as above provided; (*g*) that all signals must be restored to the danger position before a second train can be admitted to the block.

The system also includes repeaters or miniature signals in each tower, showing condition of all signals controlled from it. They show position visually, and warn audibly if signals are not working properly or if lights are extinguished. Duplicate signals working simultaneously with regular signals are also provided, thus giving visual signals on both sides of each track. Those on the right side of the track are low, and those on the left high, signals. This arrangement is, as far as possible, to meet the changing conditions of fog and smoke.

The various appliances described either had been in actual use in some form or could be tested practically before any considerable expenditure was required, excepting perhaps the gravity lifting, in place of the Sykes or gravity releasing locks.

The new locks have been in actual and constant use for several weeks and have given eminent satisfaction. The arrangement for automatically restoring signals to the danger position has been applied to the initial block in several cases, and has passed the experimental stage. Its application to all visual signals used in guarding short tunnel blocks, with crowded traffic, is desirable in that it provides against operators inadvertently leaving signals clear, thereby creating the possibility of engineers taking a clear signal at the entrance of the next block and overlooking an intermediate danger signal, temporarily obscured. The audible signals must not be restored automatically, else they would be sounded by the rear portion of long trains and cause unnecessary delay. The improved system, however, makes it possible for the operator to restore the gong signal, should any necessity arise for warning a train after the engineer has passed the visual signal. The torpedo signal should not be restored during the passage of a train, else the operator might, by misjudging the position of a train, restore the signal too soon and explode a torpedo under the rear car or truck and leave the exploder empty during the approach of the following train, it being necessary to clear a signal, and restore it, to place another torpedo in position.

The improved system further guards against the possibility of operators clearing signals in any but by the appointed means above described. The whole is so arranged that, should there be any failure in or fracture of either the electric or mechanical parts, the signals will at once assume and maintain the danger position. The chance, however, that both the all-clear and caution signal appliances will fail at the same time is very remote. Should such a case arise, recourse can be had to regular telegraphic communication, and trains move past the signals at danger by special orders or by use of clearance cards. It is not suggested that the secondary system, or audible signals, are necessary under any ordinary circumstances and conditions. They have not been applied on the Harlem line at other than tunnel blocks, where the conditions tend to produce somewhat frequent failures in the proper working of all mechanical and electrical appliances, and where the congested condition of traffic forbids any delay that any signal system can safely prevent. The object in providing the secondary locks and circuits there is to prevent any appreciable delay to trains should the working the regular system fail to display clear signals when the block ahead is unoccupied. The failure of the regular locks to release when the block ahead is clear should be of rare occurrence where the conditions for construction and maintenance are favorable, and audible signals are not considered necessary where visual signals showing both position and color can be distinctly seen under all ordinary circumstances.



OLIVER'S PATENT SUB-STRUCTURE.

Oliver's Patent Sub-Structure.

The engravings show a sub-structure designed for any sort of super-structure, but especially for bridges and other structures in which the foundations are exposed to the action of water. This improvement was designed and has been patented by Mr. S. A. Oliver, agent in Houston, Tex., of the King Bridge Company, of Cleveland, O. The patents are quite recent.

The primary object was to produce a simple and inexpensive sub-structure which can be easily erected, will have the necessary strength, will be protected against the action of water, and in which the protecting feature may be easily removed when necessary. The upper, or inside, tubes may be inserted to whatever depth is thought desirable into the lower tubes, and both are filled with concrete, as indicated in the engravings. The lower tubes may be secured by piles as shown, or by anchor bolts where a rocky bottom is found. The engravings show special designs for three different conditions, and they are so simple and so well shown in the cuts that further explanation is quite unnecessary.

The Broadway Cable Road.

It is now hoped by the engineers of the Metropolitan Traction Company that the cable cars will be running on Broadway, New York, within six weeks. One of the engines in the power house at Broadway and Houston street was started up April 10, and work on the others is well advanced.

Some of the Questions Before Railroad Managers.*

For the first time since this Association was formed at Cincinnati, in 1886, it meets outside of the city of New York, and the moving cause which has impelled us to hold our semi-annual meeting here to-day is the desire to get closer to the domiciles of our Western neighbors, with the hope thereby to increase their interest in our work and in the purposes for which we are associated together. These purposes are surely worthy of attention, by those who are responsible for the efficient management of the railroads this country. They are formulated in our rules of order as "the development and solution of problems connected with railroad management in the mutual interest of the railroad companies of America." How far the Association has fulfilled the purposes a reference to its proceedings will show, in its treatment of the problems of Standard Time, Standard Train Rules, Standard Freight Car Couplers and Car Service Associations, while there is much which it has accomplished which is not recorded in these proceedings The frequent conferences of the leading railroad manager of the country, with their minds devoted to subjects affecting the welfare of our natural railroad system as a whole, could not but result in a better understanding among them on many points incidental to the principal topics under discussion, and I count among the benefits growing out of these gatherings the prevention of that condition of mental isolation which is often unconsciously assumed by men situated as railroad managers are. . .

It has a narrowing effect upon any man to go by himself and do his own thinking, and this is eminently true in thinking about the multifarious aspects of railroad management. One man cannot know it all. The more earnest he is, the more probable it is that he will gradually draw away from the broad road along which the consensus of experience is guiding his fellows, into a pathway where he is neither seen himself nor can see what others are doing. It is particularly unfortunate when a railroad manager follows this course in matters which involve the operations of connecting railroads or which could be more satisfactorily handled in concert with their managers. The more extensive the railroad system intrusted to the management of one man, the greater the possibility for him to become isolated in the way that I have described. . . .

The tendency of the social forces which have been developed under our present form of civilization is toward co-operation. Complain of it, oppose it, legislate against it, but it is in vain, for this is a characteristic feature of the age in which we live. Other interests recognize it and avail themselves of it, and why should it be disregarded by the most important interest in the country? . . . I have said that one characteristic tendency of the age in which we live is co-operation. There is still another —specialization. . . . At first railroads were operated with mixed trains; then the passenger service was separated, through service from local service, and now we have limited or suburban passenger trains, cattle trains

*Address of President H. S. Haines delivered at the meeting of the American Railway Association at Chicago, April 12, 1893.

and perishables and refrigerator trains, all evidences of this tendency to specialize as the traffic increases in extent and becomes more diversified in character. But it is not alone the train service which isthus specialized; the time comes upon roads with rapidly increasing business when these varieties of train service cannot be all conducted upon the same track, and we see roads double tracked to separate the trains running in opposite directions, and even four-tracked roads to separate the passenger from the freight train service. This separation of tracks, as well as trains, has now reached its ultimate limit. We have increased the capacity of our freight cars, the number of cars in a train and the number of trains in freight service as well as in passenger service. On most of our roads we have these trains running along on the same track at different speeds. We are abandoning the effort to keep these trains at safe distances apart by time intervals, and are adopting space intervals instead. What we know as the permissive space interval we feel must be superseded by the absolute space interval. The maintenance of this space interval by human agency, frail and at times negligent, is being replaced by automatic devices which neither sleep nor forget. With more frequent and faster trains the space intervals must be shortened until the limit is reached within which a train can be stopped on signal, and yet the public cries for more; for more speed; for more frequent service.

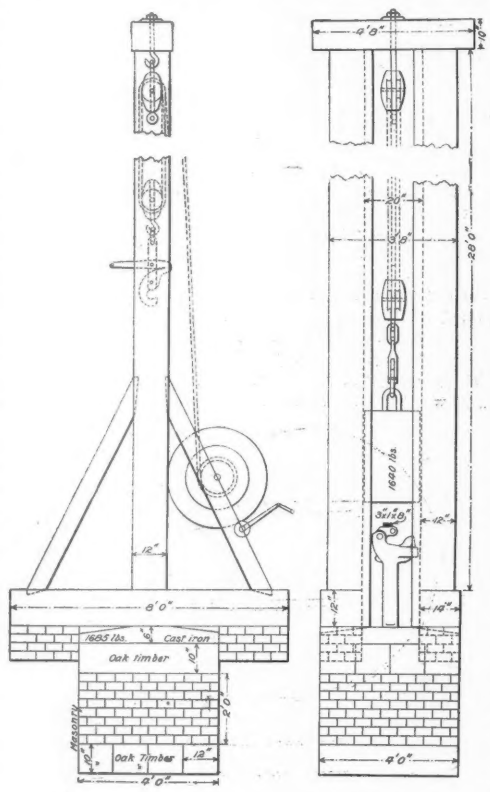
When mechanical engineers speak of a possible speed of a hundred miles an hour, I ask myself, Where is the railroad upon which such a speed is to be maintained for even one hour at a time? Is there such a road in existence in this country to-day? This may well be termed an "iridescent dream" of the engineer until the thoroughfare has been provided upon which it can be realized. It must be a thoroughfare indeed, with a surface like a billiard table, without grade crossings, with frequent signals protecting the train absolutely for at least one mile in front and rear, and the continuity of the rails in that interval likewise secured and indicated by signal. Gradients and curves must be dominated by a recognition of the rapidly decreasing ratio of efficiency where momentum is one factor as against gravity and centrifugal force. Where is there such a road in this country—a road where a scheduled passenger train speed of 100 miles per hour can be maintained for one hour? You will all agree with me in saying that there is not one. And yet the theorists are demonstrating that it is possible, the newspapers are spreading the news, and soon the public will think they ought to have it. Once they get that notion well fixed in their minds some enterprising manager will try to give it to them, and then others will follow suit. But as none of you have the ideal road for such service, you will do in the future as you have in the past. You will eke out the deficiencies of your roadway by drawing upon that reserve of ingenuity in device and of fertility of resource which seems to spring eternal in the brain of a typical railroad man. And it is not alone in passenger train service that this increase in speed will be demanded. When our freight trains can be operated entirely with power brakes and vertical plane couplers, what an improvement there will be in their speed also, thus increasing the complication in which your service is to be involved. . . .

That accelerated speed means improved appliances, and that improved appliances mean further expenditure, which means the necessity for greater net revenue, is a chain of reasoning which, with men of your experience, calls for no argument. To reach these results the first necessity is money, and this money must come directly or indirectly from those who are to be benefited by the improved service. If they want it, they must pay for it. And here you must appeal to the traffic department for better rates, for you are steadily approaching the point at which the unit of operating cost cannot be further reduced. Steel rails, iron bridges, heavier engines, and cars of greater capacity have yielded up to you most of their available help. What remains to be saved in that way is but little. There is yet something to be looked for from better fuel performance and from the preservation of crossties and timbers, but otherwise the outlook for decreasing the cost per train mile and per car mile is not inviting, unless it may be in the direction of better methods and of better discipline. . . .

In the organization of our association there is opportunity for these men [subordinate officers] to serve on our standing committees, and in doing our work they are also serving themselves. Let me then repeat my entreaties that you should one and all renew your interests in our affairs, that you shall recognize that they are your affairs—affairs of as great moment to the corporations which you represent as are the matters for which you are individually responsible. Make it a point to attend the meetings, to take your part in the committee work. Do not leave a few men as busy as yourselves to take all this burden for your benefit. Respond promptly and completely to the circular letters calling upon you for information. When you receive a telegram calling upon you to render some special assistance, either personally or otherwise, give your mind to it and see that the help is given. This is the sort of co-operation that is wanted to make our Association fulfill its beneficial purposes—purposes in which the welfare of the traveler, the shipper, the employé, the official and the stockholder are alike involved. . . . I speak thus emphatically because I am about to retire from the honorable position which I have now held for six years. While I have given during that time much attention to your affairs, which either had to be taken from my hours of labor or of rest, I have done so cheerfully, because of the willing helpmates who surrounded me. Not only as your presiding officer, but also as an ex-officio member of your standing committees, I have seen how these men, few in number, have carried on the work of the Association. It is unnecessary for me to refer to them by name. You have seen them on the floor at our meetings, their reports are recorded in your proceedings. To them you are indebted for Standard Time and Standard Rules, for uniformity in safety appliances and for car service associations. And in the time to come there are yet other problems for them to solve in the interest of better service and of better results. Come, then, to their aid as I have besought you, not in the way of spasmodic impulse, but in steady all-the-year-round support, and you will find that in the American Rail way Association you have a central organization which can be made not only the focus for the dissemination of uniform methods, but also when necessary a rallying point for mutual protection.

A Drop for Testing Automatic Couplers.

The illustration shows the arrangement of the drop used by the Buckeye Malleable Iron Company for testing the Buckeye automatic coupler. One or two couplers out of every heat are tested in this drop, and if



Drop Used by the Buckeye Malleable Iron Company.

these do not stand the test the lot is rejected. This is done to make sure that the malleable iron is running uniformly. This company says that the metal can be obtained such that a properly designed coupler cast from it will stand the M. C. B. drop test.

Referring to the illustration, the four oak timbers 10 in. × 12 in. were laid on hard pan several feet below the surface of the ground. On these was built solid masonry 2 ft. thick, laid with Portland cement. Four oak timbers, 10 in. × 12 in., were then laid into the masonry at right angles to the timbers on the bottom. The whole was capped with a casting 6 in. thick in the middle, where the coupler rests on it, tapering to 4 in. at the edges. Its weight is 1,685 lbs. This foundation is very solid, as shown by the fact that after testing several hundred couplers on it it has not settled one-eighth of an inch.

In testing the couplers the Buckeye Company places a plate of iron 1 in. × 3 in. × 8 in. on the face of the knuckle, as shown in the cut, to make sure that the full force of the blow is received by the knuckle.

This company has no trouble in making automatic couplers that will stand the M. C. B. tests when tested on this foundation. However, it is not generally understood that the proposed M. C. B. specifications for drop tests allow of wood being used in the construction of the foundation. The resilience of the wood used in the drop foundation shown affords considerable protection to the coupler. The Buckeye Car Coupler Co. states that it is in favor of keeping the Master Car Builders' tests at three drops at 10 ft. and two drops at 15 ft., the coupler to be supported on a solid foundation. The company states that the test is not too severe, and that a coupler can be made that will stand it.

Efficiency in Combustion in Locomotives.

At the March meeting of the Central Railroad Club, the following report was submitted by the special committee on "The best practice for increasing the efficiency of locomotives with regard to combustion and prevention of smoke."

Modern locomotive boilers are, at best, uneconomical when compared with stationary boilers of modern design. Experiments have demonstrated that from 50 to 65 per cent. of the heat units contained in the coal passes away from the locomotive boiler without assisting in the evaporation of the water; consequently, were we able to increase the evaporative power of our boilers without increasing the coal consumption, by utilizing, or absorbing, more of the heat units, we would materially increase the efficiency of the locomotive and reduce, to a large extent, the amount of smoke.

It is therefore advisable to consider a few of the details of stationary practice, whereby they are able to develop such economy, and see if we cannot find some features which can be utilized in locomotive practice with beneficial results.

Stationary boilers not having the limitations imposed upon them that locomotive boilers have, can be designed to give nearly the theoretical evaporative power. Greater heating surfaces and grate area can be obtained, more efficient arrangements for the heating and supplying the feed water to the boilers can be introduced, a more perfect circulation of the water in the boilers accomplished, and bridge walls and flue dampers introduced to retard the flow of heated gases as much as possible in their transit from the firebox to the chimney in order that all of the available heat units may be absorbed by the water. By these means 11 or more pounds of water are evaporated per pound of fuel, whereas with a locomotive boiler we are doing good work, and consider we have a very efficient boiler, if we evaporate seven pounds of water per pound of fuel, but more often we have to be contented if our boilers only evaporate four to five pounds. Inasmuch as such high evaporative service as is produced with stationary boilers means economy in heat units, or, in other words, economy in coal, such economy must be produced by slow combustion of the fuel and by causing the heated gases to impinge upon the boiler and move sluggishly through the flues, so that its heat units can be absorbed by the water.

Such, then, being some of the causes of the increased economy of stationary over locomotive boilers, let us see what has been done with locomotive boilers to accomplish, in a measure, similar results.

A large number of railroads are using in their locomotive fireboxes brick arches, supported either on water pipes or from the side sheets, which, in a measure, is a device for retarding the flow of heated gases from the firebox to the stack, since, by its use, the gases must travel a longer distance before entering the flues, are brought into more intimate contact with the side and crown sheets, and consequently are longer exposed to the flames in the firebox, and much, which otherwise would pass away, are ignited and burned, thus giving up their heat units to the water in the boiler. This device, on a prominent trunk line, has effected a saving of 5 per cent. in coal, as well as largely reduced the quantity of black smoke, which saving might partially be attributed to the milder action of the exhaust, avoiding to a great extent that tearing action upon the fire which is common on locomotives not provided with brick arches; but the greater part of the saving is, in our judgment, due to the increased amount of heat units absorbed by the water through the crown and side sheets, which is made possible by the application of the arch.

Many roads are using what are known as Wootten boilers, or boilers provided with a combustion chamber and with nearly three times the grate area of a common locomotive boiler, for the purpose of obtaining a slower combustion with the same quality of coal, or for the purpose of burning a cheaper quality of coal, containing many less heat units, and which it would be impossible to burn on a regular type of locomotive boiler. These boilers are provided with bridge walls, which in a measure accomplishes the same results as the brick arch in a common locomotive firebox, or the bridge wall in a stationary boiler plant.

In this type of locomotive we necessarily use much larger exhaust nozzles than on regular engines, thereby avoiding the tearing action of the exhaust upon the fire, and with proper care on the part of the fireman no black smoke should be emitted from the stack. The chairman of your committee has tested several of these boilers with bituminous coal and obtained very excellent results both in economy of fuel and freedom from black smoke.

Experiments with compound locomotives have thus far demonstrated that slower combustion is required, larger nozzles can be used, a slower movement of the gases obtained, and almost freedom from black smoke, but as the results obtained differ very materially on the several roads where tests have been made, we prefer to postpone any further discussion on this type of locomotive until the results obtained are more uniform.

We have shown that to obtain higher efficiency in combustion and a reduction of smoke it is necessary to obtain a slow combustion of the coal, a sluggish movement of the heated gases in the firebox, a reduction of the tearing action of the exhaust upon the fire, and an intimate contact of the heated gases with the crown and side sheets.

To accomplish this in locomotives we should aim to modify our present draft appliances as much as possible, to admit into the firebox the required amount of air to produce combustion, and to educate our firemen to apply the coal judiciously, as the smoke produced is generally in proportion to the depth of fire and the amount applied at each firing.

Heavy firing not only reduces the temperature of the gases below the point of ignition, but makes the smoke a dense body that the air cannot penetrate. Light and frequent firing, or covering the fire with a small amount of coal, does not materially reduce the temperature, and the black smoke is thereby reduced to a minimum if not entirely avoided.

A. E. MITCHELL
J. D. CAMPBELL,
FREDERICK B. GRIFFITH, } Committee.

The New Orleans Bridge.

Mr. J. L. Armstrong, assistant to Mr. E. L. Corthell, has completed the surveys for the projected bridge over the Mississippi at New Orleans, a careful account of which we recently published. The surveys were completed March 1, and since that time Mr. Corthell and his assistants have prepared plans for the approval of the Secretary of War.

Schaffer's Patent Basic Steel Bolster.

The Missouri Pacific has adopted as standard a cast steel bolster designed and patented by Mr. M. B. Schaffer, Master Car Builder of the road, which is of interest as showing the present tendency to the use of metals in car construction, especially where this results in a decrease in the ratio of the weight of car to its carrying capacity.

So clearly is the bolster illustrated in fig. 1, and the bolster truck in fig. 2, that a description is hardly necessary. The bolster is made of one casting and weighs between 400 and 450 lbs.; in the old style bolster there are about 60 pieces and the total weight is between 675 and 800 lbs., and this is an advantage decidedly in favor of the cast steel bolster. With this bolster the transom on the body of the car can be made with a 9-in. set instead of a 6-in. set without altering the height of car body.

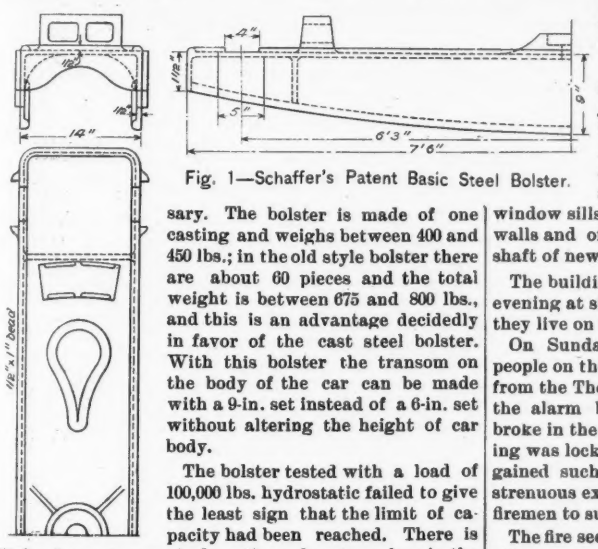


Fig. 1—Schaffer's Patent Basic Steel Bolster.

The bolster tested with a load of 100,000 lbs. hydrostatic failed to give the least sign that the limit of capacity had been reached. There is little chance to use bad castings, for at no place in the bolster is there any great amount of metal where blow holes might be hidden beneath a good surface. It is claimed that with this bolster and a transom with 9 in. set, all trouble of cars getting down on their bearings and causing wrecks by the trucks not curving will be obviated. Eight hundred bolsters a month for repairs only are used on the Missouri Pacific system; the first cost is about $10 more than for the wood bolster, but this is more than offset by the reduction in cost of repairs. It is supposed that in a collision between trains at 35 miles an hour these castings may bend transversely about 1 in.

The advantages claimed for the basic steel for castings over the acid steel are as follows: The element that gives most trouble to steelmakers is phosphorus, owing to the hardening and cold shortening effect it imparts when but a small fraction of one per cent. is present. These effects are found to be highly intensified with metals rich in the other metalloids generally used. In steel castings where the presence of these metalloids is prominent, in fact compulsory, phosphorus produces most surprising results in the way of brittleness, though the carbon contained may be very low. In brief a steel casting containing more than .05 phosphorus is very nearly up to, if it has not passed, the limit of safety. Owing to the chemical equations which obtain when operating under basic conditions, any phosphorus existing in the new material of the charge is eliminated as a phosphate in the shape of slag. The phosphorus being entirely eliminated, for all practical purposes, and the carbon well under control, the steel produced, when sound, is always reliable, the element of chance, so prevalent to the acid process, being overcome.

A Fire in a Fireproof Building.

BY A VICTIM.

On Sunday morning, April 2, a serious fire occurred in a modern fireproof building, Temple Court, New York City. The building is a favorite house for engineers, patent attorneys and those of kindred callings; and the whole matter of fireproof construction is so interesting to engineers that it does not seem amiss to give a little space to this fire in the pages of a "Journal of Transportation," especially when that journal numbers among its readers many engineers.

The building has two distinct parts, the old and the new. The former is a quadrangle nine stories high covered by an immense glass roof, the offices arranged along the walls like chicken's nests in a hen roost, all having windows on the streets and doors opening on iron galleries in the open quadrangle. The walls of the offices toward the inside are all made of varnished wood and ground glass. The dividing walls are made of hollow brick, leaving a door opening into each adjoining office. These doors and their frames are throughout the building made of ash and varnished.

The new building is composed of two wings, each 10 stories high. Between the two wings there is a light and air shaft about 30 ft. wide by 75 ft. long. Through the centre of each of the wings there is a hall with offices on each side, receiving light on the one hand from the streets and on the other from the shaft. This shaft had no roof, but the stores on the ground floor were protected by a glass roof in the shaft. All of the offices had walls exactly as in the old building, the two halls receiving all their light through the ground glass of the inner walls. There were no iron or other fireproof doors to shut off either hall or elevators from any other art of the building, nor to shut off one set of offices from another. There were no iron shutters to prevent fire from jumping from one floor to the next either below or above.

There were no standpipes, fire hydrants, hose or any appliances whatsoever to extinguish any possible fire, nor were there any kind of alarms or signals to indicate or announce fire in any part of the building, and hence there was no use for a fire-pump. There were neither fireplaces nor electric lights in use, as the entire building was heated by steam and lighted by gas. The engineer did not live in the building nor did any of his assistants, but it is claimed that there was a watchman on duty.

The halls were all laid with tile, except a few feet where the old and new buildings joined. The roof was made of hollow brick between iron beams covered with cement. All galleries, stairways and floor girders, as well as window spandrels, are of iron; stairways having marble or slate steps. The window sills are of sandstone in the case of the outer walls and of bluestone in case of windows in the light shaft of new building.

The buildings are practically deserted every Saturday evening at six, the janitor's family alone remaining, as they live on the 10th floor.

On Sunday morning, April 2, at about 7 o'clock, people on the streets noticed volumes of smoke issuing from the Theatre Alley wing of the new building, and the alarm being given the firemen soon arrived and broke in the main door on Beekman street, as the building was locked and no one in attendance. The fire had gained such headway that it took 2½ hours of most strenuous exertions on the part of a very large force of firemen to subdue the flames.

The fire seems to have started on the seventh floor in either one or more of rooms 724 to 727, but most likely in No. 725. From this it seems to have burnt through the connecting doors between offices, then followed the inner partitions separating offices and ante-chambers, then crossing these, the hall doors, light casings and frames took fire, communicating to the set of inner offices, and breaking through the windows on the light shaft, set fire to the opposite window frames thirty feet away. The flames from the west wing struck the walls of the east wing, rebounding down and up, thereby setting fire to the sixth and fifth stories below, and the eighth, ninth and tenth above. The destruction extended into the old building to destroy one set of guides of the nearest elevator and two sets of offices.

There was no communication for the fire from floor to floor through ceiling or pipe holes, as all of these were completely sealed by cement surrounding every pipe, and the ceiling arches of hollow brick were not broken by the fire.

The amount of damage done by fire in this so-called fireproof structure is about as follows, aside from dam age by water:

On 5th floor, six rooms and three-quarters of their contents destroyed; on 6th floor, seven rooms and three-quarters of their contents destroyed; on 7th floor, 12 rooms, not a vestige of furniture, books and documents left; on 8th floor, 10 rooms and seven-eighths of their contents destroyed; on 9th floor, eight rooms and three-quarters of their contents destroyed; on 10th floor, six rooms and over one-half of their contents destroyed.

As this building was warranted fireproof very little insurance was carried and but little effort was made to provide large safes for protecting records and documents except such as had money value, and the amount of such instruments which were lost and the totality of their destruction is truly amazing. Libraries costing thousands of dollars left no trace, and although the wooden floors were not burned through, being protected by fallen papers and books, there is absolutely nothing left in rooms 721 to 730 but the bare partition walls in a crumbling condition. Not a vestige of woodwork of any kind remains in windows or door or partition framing. There can be no doubt that the fire had been burning for many hours before it was discovered, and that the watchman, who is said to have been on duty, had not been near the origin of the fire, probably after midnight of Saturday, April 1. The evidence of this is quite conclusive.

Had this fire started on a lower floor there is but little doubt that the intense heat would have caused the destruction of the building by collapsing, as the light shaft would have acted like a gigantic chimney. As it was the heat was sufficient to bring the wrought iron lintels over the windows, composed of two 8 in. channels, to a red heat, thereby causing these and the walls above them to bulge to an alarming degree, which will require their reconstruction from the seventh floor to the roof coping.

Among the documents completely destroyed and of particular interest to engineers were all the records of the Committee on Standard Tests and Methods of Testing Materials of the A. S. M. E., of which Mr. Gus. C. Henning was the Reporter.

The Talbot Open Hearth Basic Steel Process.

A committee of the Tennessee Coal, Iron & Railroad Company have been making some experiments with this process at the works of the Jefferson Steel Co., North Birmingham. They report favorably on the process, both in the matter of adaptability to their requirements and in the value of the product, saying: "We do not think it necessary to submit any argument as to the advisability of the Tennessee Coal, Iron & Railroad Company erecting a steel plant. Your committee is of the opinion that the plant should be located and erected looking to a minimum capacity of 500 tons daily. This can be done at an outlay of about $1,000,000." The mass of the ores in the South contain too much phosphorus for use by the acid process of steel making, whether pneumatic or open hearth; and while the brown ores are suited to the Bessemer basic process, they are not available for the Tennessee company, which produces its iron from the much larger deposits of red ores. These do not contain phosphorus enough to keep up the heat in the after blow of the basic Bessemer process, and also have too high a percentage of silicon to permit conversion in the open hearth. It has been proposed to first burn out the silicon in the Bessemer converter, and then finish in the basic open hearth. The Talbot process eliminates most of the silicon by pouring the melted iron through basic slag, which is low in silicon and high in lime and oxide of iron. The silicon, which has been reduced in the smelting furnace along with the iron, apparently takes up oxygen from the oxide of iron in the slag, staying in the slag, and the slag also takes up some of the phosphorus and a little of the sulphur, while at the same time the deoxidized iron of the slag is added to the charge, so that there is a gain of iron instead of a loss as by first blowing the charge in the Bessemer converter. This desiliconized metal is then ready for treatment in an ordinary basic open hearth furnace in the ordinary manner. The savings effected by this process over the old basic open hearth process are fourfold:

1. The molten metal can be taken direct from the blast furnace to be treated by this process, thus saving the expense of remelting. 2. With this process the cheapest iron made about Birmingham can be used, that is, gray forge. 3. There is no necessity for the use of scrap when desiliconized metal is used. 4. The desiliconized metal can be put into the open hearth furnace hot, thus saving a large percentage of the time required to melt a cold charge.

Gray forge pig iron, which for some time has been

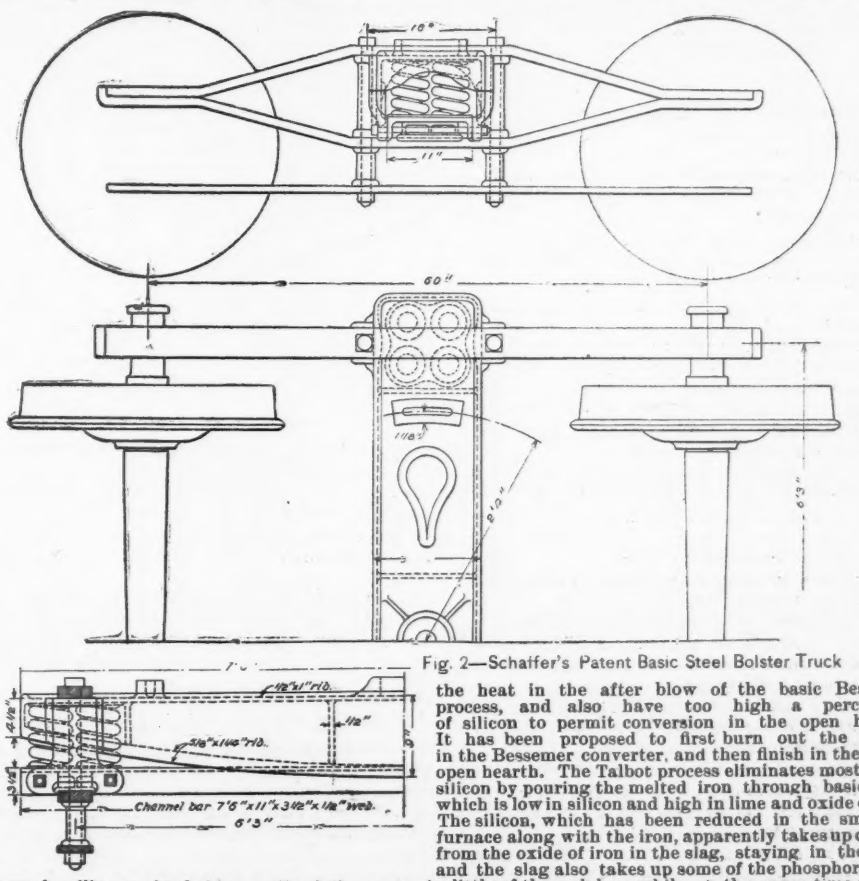


Fig. 2—Schaffer's Patent Basic Steel Bolster Truck

quoted at Birmingham at $8 per ton, usually contains by analysis about 0.75 per cent. of phosphorus, from 1.50 to 2.25 of silicon, and from 0.01 to 0.04 of sulphur. When the basic slag does not contain enough iron it is enriched by adding the necessary amount of brown hematite ore. The resulting steel is reported as of an excellent quality, low in phosphorus and sulphur, with from 0.02 to a trace of silicon.

This process, if it proves as successful in practice as in experiment, will be of great value, to the South in particular, by increasing the demand for its lowest priced iron product, and to the whole country, by increasing its supply of soft steel.

Defect Cards.

At the March meeting of the Central Railway Club, the special committee on "A definite defect card to cover partial repairs to cars, also covering such modifications to rule 6 as may be necessary to make it correspond with the new card," reported the following for adoption:

"Rule 5. Defect cards shall be 3½ by 8 inches. They shall be printed on both sides and shall be filled in both sides with ink or indelible pencil. The card must plainly specify each item for which charges are authorized."

The report of the committee was accompanied by the following forms of the cards:

The partial repair card is to cover partial repairs made necessary for the safe running of the car and to be used only for partial repairs of defects, as noted on original M. C. B. defect card. Repairs so made must be stricken off the original M. C. B. card, which must be left on the car.

Defects noted on original M. C. B. Card.

Defects noted on original M. C. B. Defect Card.

.....

.....

Singned by.....Inspector at.....Station,

Car No.....Initial.....R. R.

on..... .....R. R. Defect Card No.....

Dated.....189....Rep. made Date.....189....

Defects rep.....

.....

.....

.....

Sig..... ..M. C. B..... R. R.

This card is to cover partial repairs made necessary for the safe running of car, and to be used only for partial repairs or defects as noted on original M. C. B. card.

Repairs so made must be erased from the original M. C. B. card, which must be left on car.

No.... .....

M. C, B. For Partial Repairs. DEFECT CARD.

The following repairs have been made on

Car No.....Initial.....R. R.

on.....R. R. Defect Card No.....Date.....189..

Repairs made Date.....189..

Defects repaired.....

.....

.....

.....

Signed.....M. C. B.....R. R.

This Card to accompany bill as Voucher for work done.

This card to be made with Ink or Indelible Pencil.

Mr. Lentz moved the adoption of the recommendation of the Committee.

Mr. Mackenzie explained that it had not been found necessary to modify rule 6, and hence the proposed changes in rule 5.

The motion of Mr. Lentz prevailed.

WRONG DRAWBARS.

The President invited discussion on wrong drawbars and the difficulties they cause.

F. H. Soule said that the Lake Shore was doing a good deal of carding for these cars. The practice on this road is to stencil the car, showing the style of drawbar used. There are a great many cars in service upon which the standard M. C. B. drawbar has been displaced by some other style by some road making repairs, and these have to be cut out when the cars get back to their owners. It was impossible to tell what road made the change. Stenciling of the cars would prevent this.

Mr. Potts believed that honest carding would obviate the difficulty.

Mr. Soule replied that this would not effect such a result because cards often became detached from a car, so that stenciling was the only reliable method.

Mr. Mackenzie said that on the Nickel Plate M. C. B rules were strictly followed and no innovations were tolerated. On some roads, under rule 19, wrong drawbars were introduced—substituting wrought iron for cast iron bars. It was a villianous practice and attempt at fraud, and at the next M. C. B. Association convention he should endeavor to get some legislation through that will stop it. Another thing, roads carding a car for foreign drawbars should give the weight of the bar.

Mr. West submitted that it was a fact that the rule was money in the pockets of the various companies, affording a financial benefit not otherwise obtainable. Mr. Bronner was in accord with this opinion. If the rule was changed he was in favor of full value being given for scrap iron where wrong bars are put on.

Mr. Waitt said that inspectors on the Lake Shore were required to card the weight of a wrong drawbar, and if all roads would do this much trouble would be obviated.

Mr. Petrie believed that cards should be applied for all wrong equipment, and if those applying cards were held to as strict account as inspectors there would not be so much trouble. He thought that the point made by Mr. Potts was a good one. Where a car is equipped with a standard drawbar the substituting of any other should not be allowed under any circumstance. The rear attachments should be stenciled upon the car, and then an inspector would know what to do if a spindle was substituted for a pocket drawbar. Then no common drawbars would be used and freight would not be delayed.

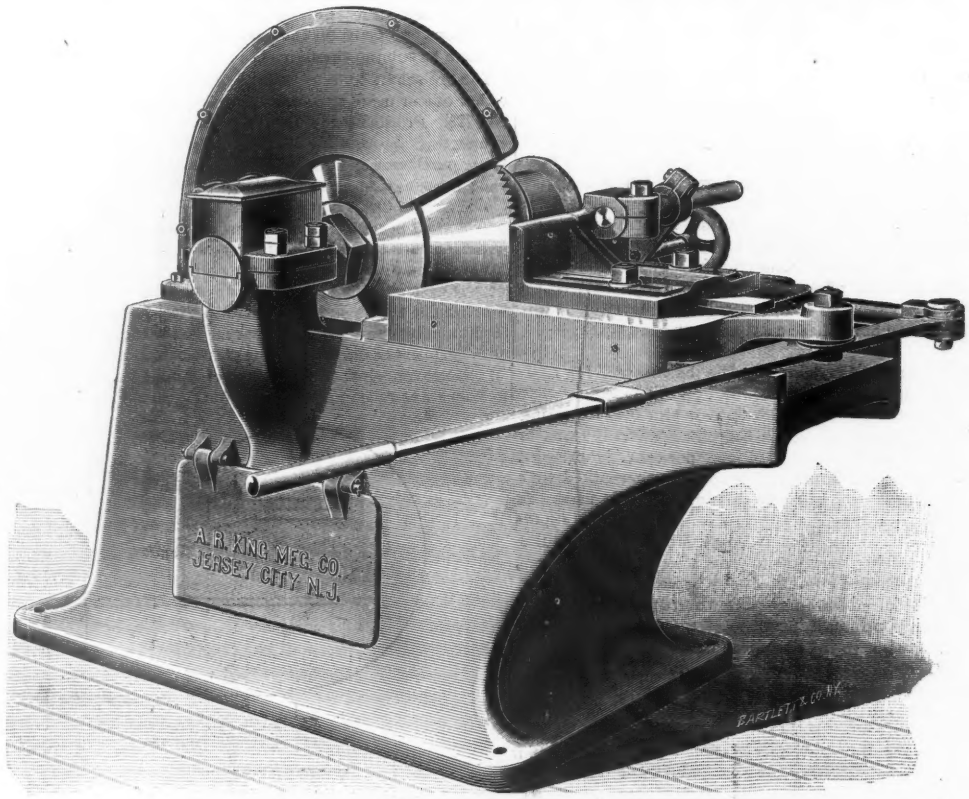
A New Hot Saw for Metal.

The metal sawing machine which is shown has been recently introduced by the A. R. King Manufacturing Company, of Jersey City, N. J. It is designed for genera use in blacksmith shops of locomotive and machine works, and in fact wherever belt power is available, and was developed from the experience of the builders in their shops where they built one some time ago for their own use. It will cut iron and steel at an ordinary red heat and requires little attention. It has been found that the wear of the teeth is hardly perceptible after months of use.

The saw is 30 in. diameter by ⅛ in. thick, with teeth about in. ½ pitch. It is made of soft steel and not hardened. It is held between flanges on a steel shaft 3⅜ in. diameter, running in the best anti-friction metal bearing with large oilboxes to be filled with waste and oil. A guard is placed over the saw for protection.

The table is supported on the slides by four steel rollers, and moves with ease. On this table is an angle plate which can be adjusted to suit the work, and is also provided with a combination gauge for cutting to length. The gauge may be moved entirely out of the way when not required. In operating the machine, the piece of iron or steel being placed on the table, the latter is moved toward the saw by the hand lever. The work does not require to be fastened down but merely laid on the table, or, if a bar, to be held with the hands or tongs.

The saw will cut to a depth of 8 in; work 12 in. wide can be placed in front of the saw. The speed of the saw is 1,200 revolutions, and the speed of the counter shaft 300 revolutions. There are tight and loose pulleys, 12 in. diameter for 6 in. belt.



A New Hot Saw for Metals.

Spring Meeting of the American Railway Association.

The semi-annual meeting of this Association was held in Chicago on Wednesday of this week, 60 roads being represented. The total membership is now 182 railroads with 136,000 miles, the Atchison having lately joined.

The date fixed for the spring change in time tables is May 14.

The following officers were elected:

Messrs. H. S. Haines and W. F. Allen unanimously re-elected President and Secretary respectively. Other officers elected were: First Vice-President, E. B. Thomas; Second Vice-President, W. F. Merrill, of the Burlington; Executive Committee, Lucius Tuttle, N. Y.; N. H. and H.: and Joseph Wood, Pennsylvania Company; Train Rule Committee, Illinois Central Railroad Atlantic Coast Line Hannibal & St. Joseph Railroad.

The committee on safety appliances recommended that the Association adopt provisions for handholds and grabirons as shown in the M. C. B. report of 1892; and offered a resolution in pursuance of the recent law fixing the standard height of drawbar for standard gauge roads at 34½ in., variation between empty and loaded cars 3 in.; for narrow gauge roads 26 in., variation 3 in. This report was adopted. The committee had collected statistics of the standard heights and variations from roads, owning and controlling 1,060,483 cars. The heights ranged from 32 to 36 in. for standard gauge cars and the variations from 1 to 7 in. Much the greater number used heights of 33, 34 and 35 in.

The Car Service Committee recommended a mixed per diem and mileage charge of half a cent a mile and six cents a day, but the report was tabled. The resolution of four years ago for 10 cents a day which was never enforced was rescinded.

The Joint Committee reported a few definitions of terms in signaling, and stated the consensus of opinion from roads that answered on some of the principles of signaling. This report was approved as follows:

REPORT ON BLOCK SIGNALS.

The Joint Committee on Interlocking and Block Signals received replies from 51 roads, of which 15 operate block signals on about 1,700 miles of road. The committee has adopted the following definitions:

1. *Block.*—A length of track of defined limits, the use of which by trains is controlled by block signals.
2. *Block Signal.*—A fixed signal at the entrance of a block to control trains in entering and using said block.
3. *Distant Signal.*—A fixed signal of distinctive character used to give warning that another signal must be looked for.
4. *Starting Signal.*—An auxiliary fixed signal at a station or siding placed in advance of a block signal worked in connection with it, and used to start trains which having passed the block signal have stopped.
5. *Block Signal System.*—A series of consecutive blocks controlled by block signals, and operated under rules which may make its operation either "absolute" or "permissive."
6. The "absolute" operation of a block signal system permits but one train at a time to occupy a block.
7. The "permissive" operation of a block signal system permits under certain regulations more than one train at a time to occupy a block.
8. A telegraph block signal system is one which is operated manually as directed by telegraph.
9. A controlled manual block signal system is one which is operated manually, but prevents, by a mechanical device or otherwise, a "clear" signal being displayed while the block is occupied by a train.
10. An automatic block signal system is one which is self-operative, whether by mechanical, electric, pneumatic or other device.

Note.—By the Committee:

A signal should, as a rule, be displayed upon the right hand of or directly over the track it governs.

Where a distant signal of a succeeding block and a block signal are carried on the same support the block signal should be above the distant signal.

The Committee, in formulating its definitions, found it necessary to apply the term "System," or "Block Signal System," strictly to the plant itself, and not to the method of its operation.

The Committee would report as the consensus of opinion obtained from the replies,

(*a*) In the installation or operation of any *Block Signal System* it is to be recommended:

1. That the aim should be to make its operation "absolute."
2. That the operation of any block signal system should be made "permissive" by special order only.
3. That the apparatus should be so arranged that, when out of order, the signal shall indicate danger.
4. That a distant signal should be used in connection with the block signal.
5. That a form of signal should be used for block signaling differing from those used for interlocking, train order and other fixed signals.
6. That the meaning of a signal should be conveyed by a combination of color and position.
7. That a device should be used which will automatically and in due course restore the signal to danger.
8. That a hand signal should not be used in combination with the semaphore signal to indicate caution; on the contrary, it is desirable to give all signals by use of the semaphore or its equivalent.
9. That under no block signal system should Standard Code Rules 96 to 103 be disregarded.

(*b*) In the use of a *telegraph block system* it is to be recommended:

1. That the operation of the block signals should be controlled by the block signal men only.
2. That the normal position of the signal should be at "danger," so as to require that it be changed and held at "clear" to permit a train to pass.

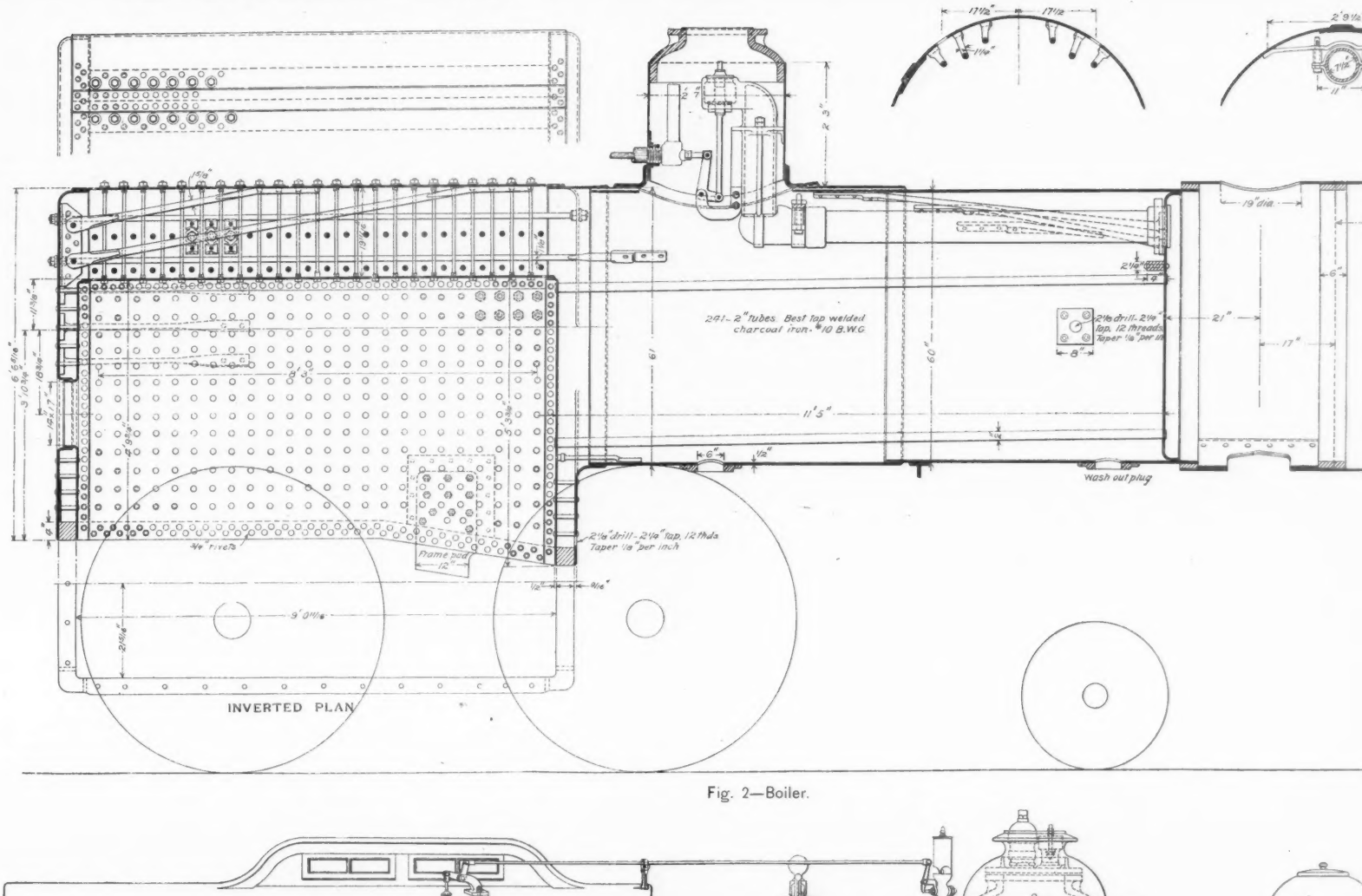


Fig. 2—Boiler.

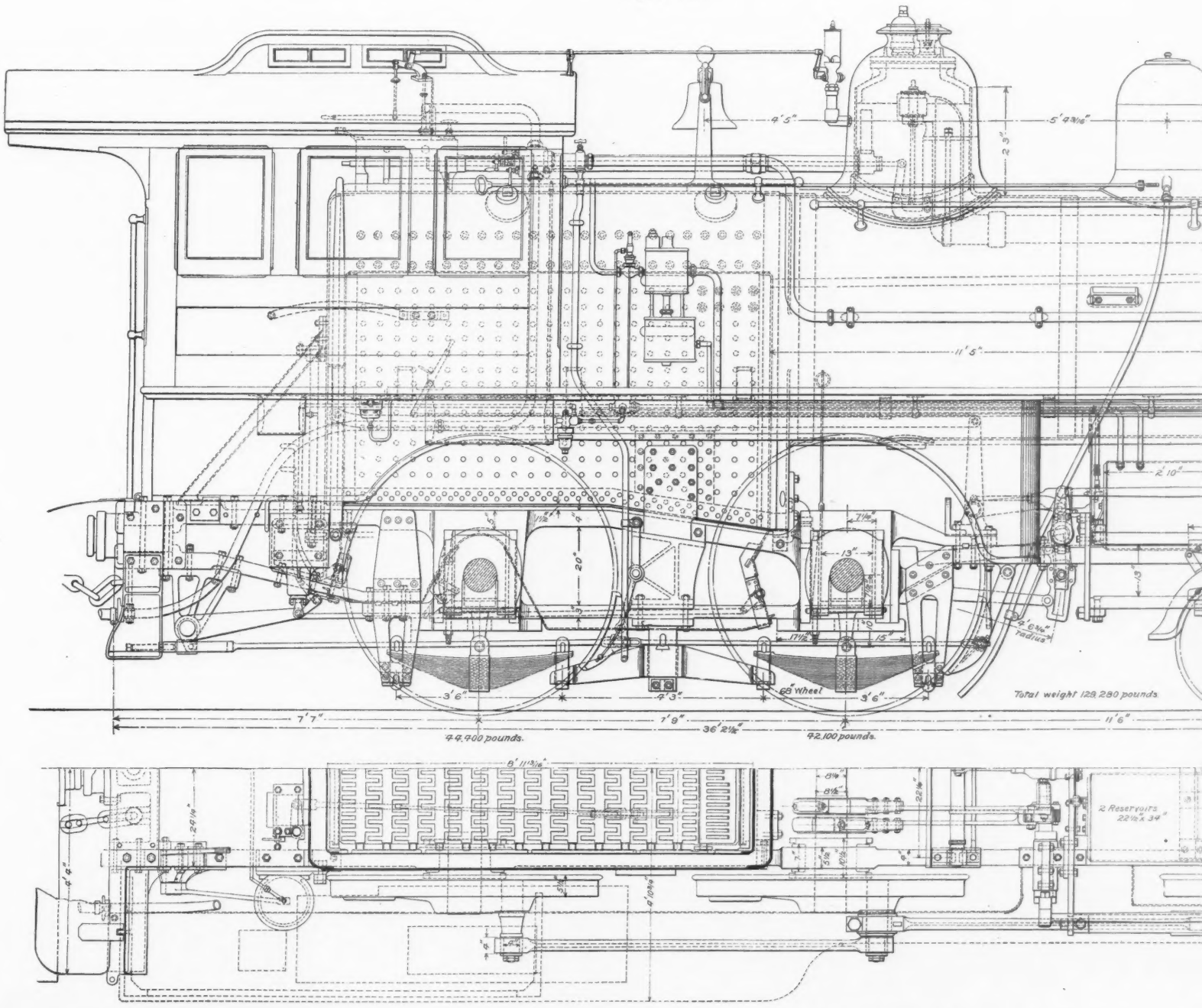
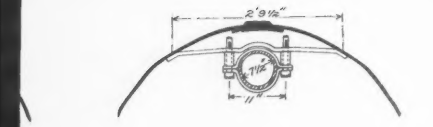
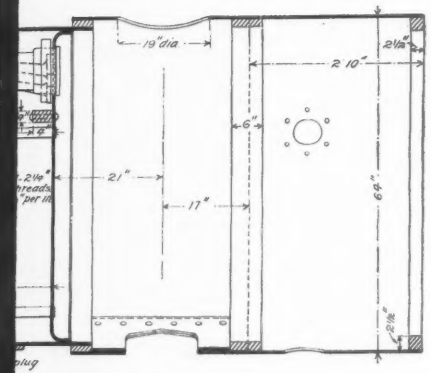


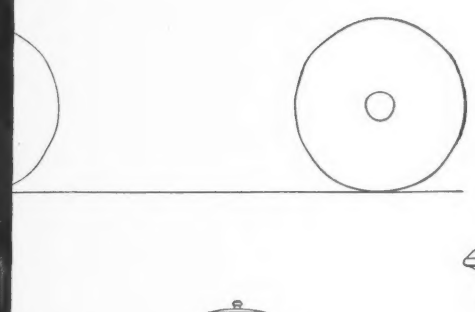
Fig. 1—General Arrangement.

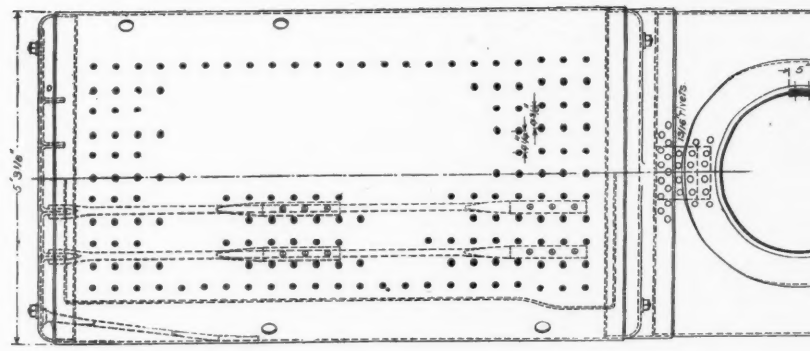
PASSENGER LOCOMOTIVE, CLASS "Y"—CLEV

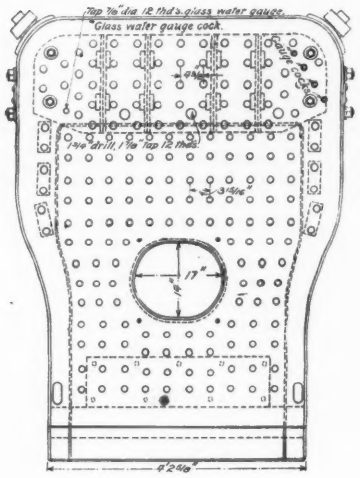
Designed by E. P. LORD, *Superintendent of Motive Power.*

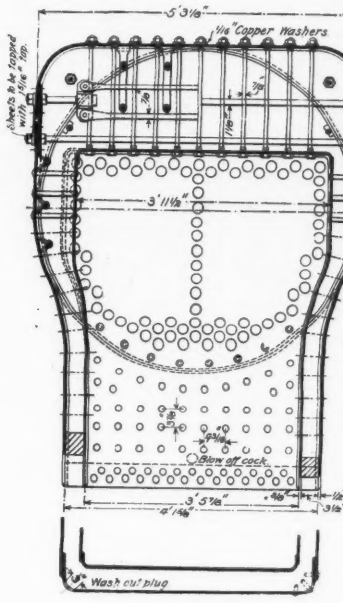


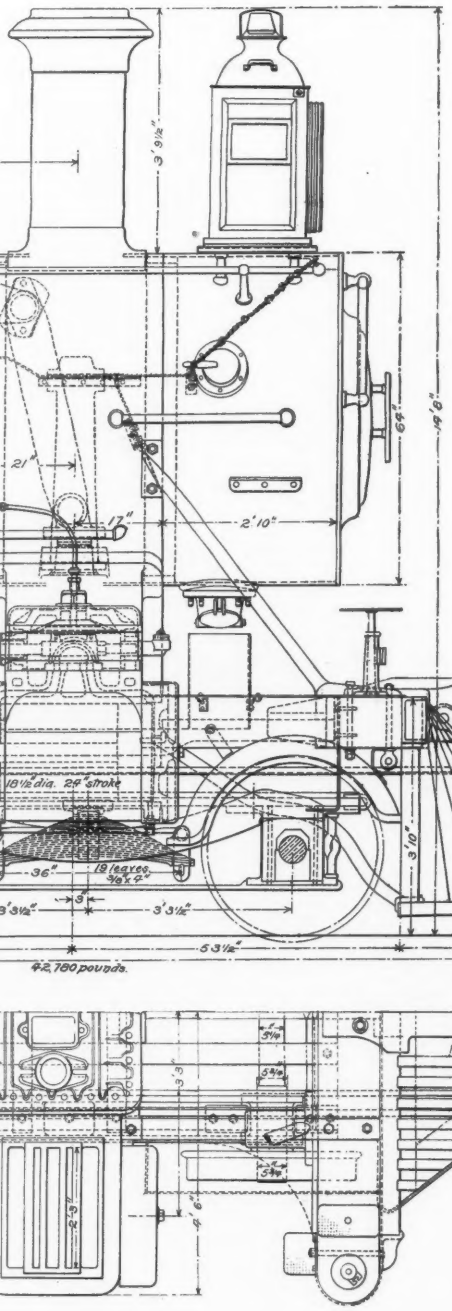


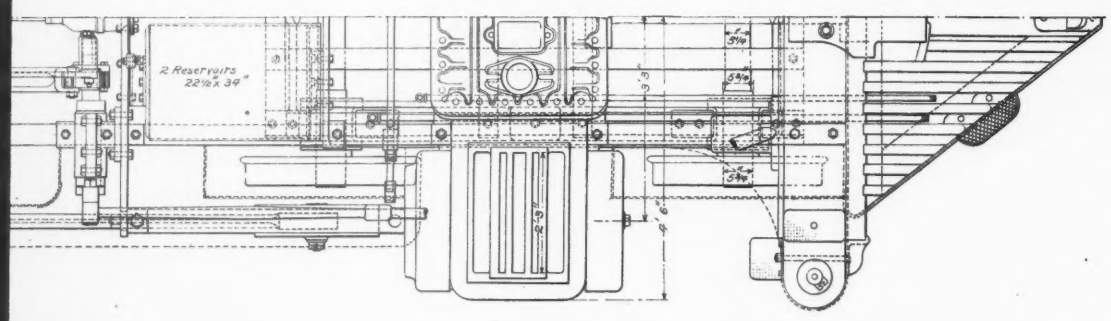


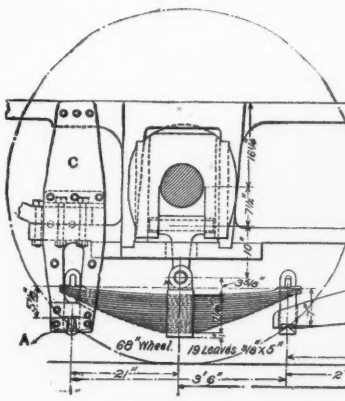












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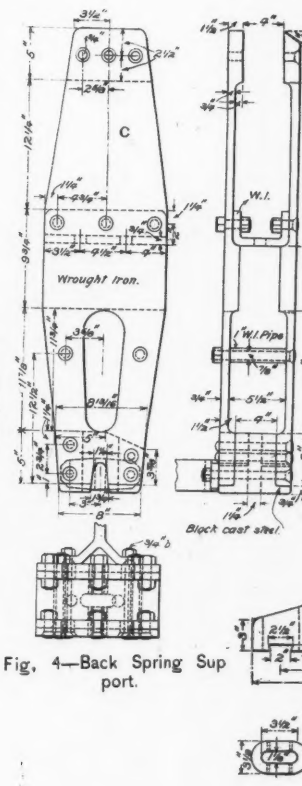
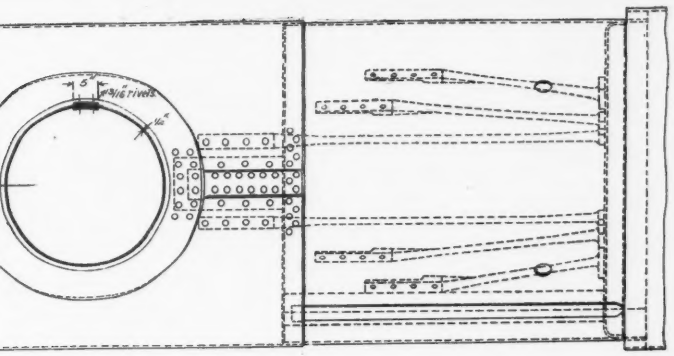
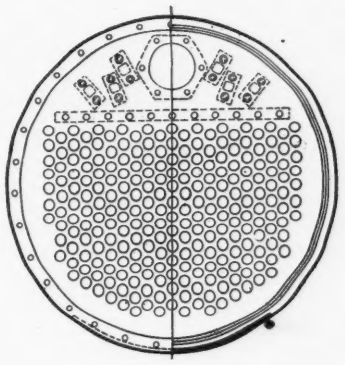


Fig. 4—Back Spring Support.

COMOTIVE, CLASS "Y"—CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS RAILWAY.

Built by the SCHENECTADY L





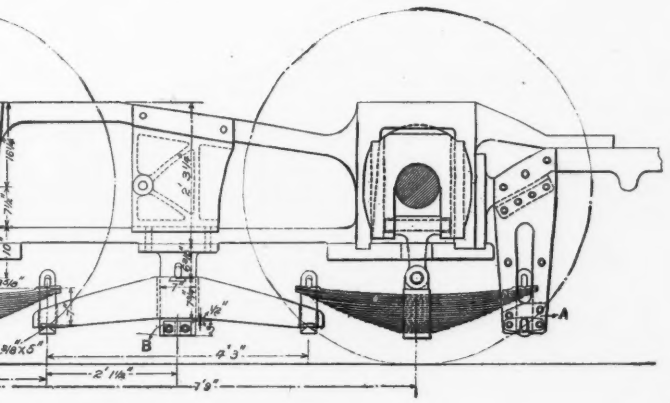


Fig. 3—Equalizing Arrangement.

Fig. 5.

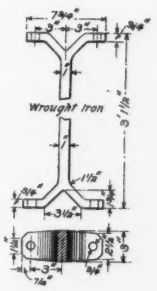


Fig. 6—Cross-tie.

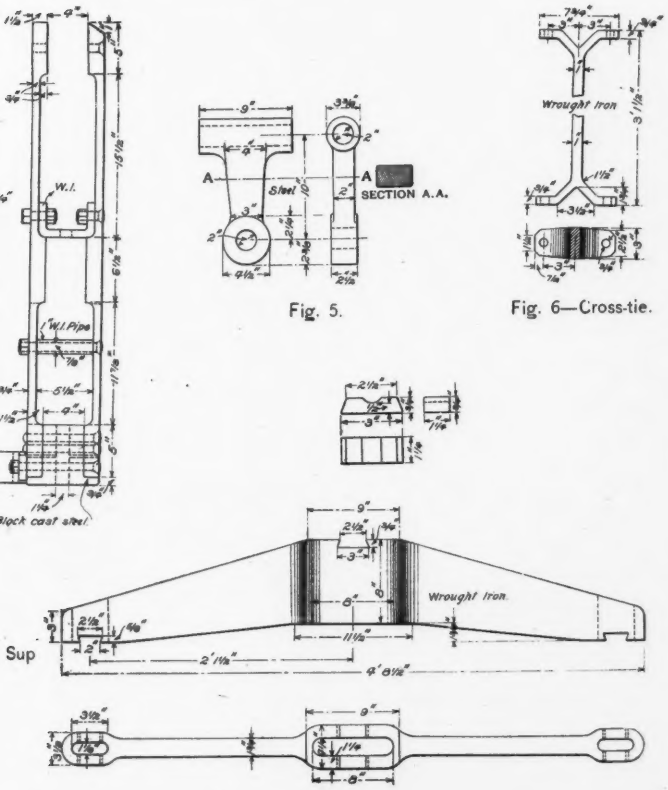


Fig. 7.

3. That the signal should be restored to "danger" as soon as the rear of the train has passed, and not before.
4. That the rear of a train shall have passed the block station, 100 yards or more, and the signalman shall have seen the "markers" (see Rule 33 of Standard Code of Train Rules), before he shall report the block vacated by said train, as "clear."
5. That when a train takes a siding at a block station, stopping in advance of the block signal, a special starting signal should be used in advance of said train, provided such signal be interlocked with the block signal.

(c) In the use of a *controlled manual block signal system* it is to be recommended:
1. That, until a block is cleared by a train which has entered it, the block signal man shall not be able to give a clear signal for another train.
2. That all sidings be interlocked at block towers.
3. That a bell or other audible signal be attached to such switches as are not interlocked, to give information to the train about to use such main line switch to leave a siding that the block is not clear.

NOTE.—The Committee has not been able to satisfy itself that any device now in existence is so absolutely sure of operation as to accomplish that which is here contemplated.

(d) In the use of an *automatic block signal system* it is to be recommeneed:
1. That a track circuit be used to control the signals.
2. That all switches in the main track be connected with the block signals.
3. That the signal at the entrance of a "clear" block should not be so arranged as to go to danger in front of an approaching train.

The committee is of the opinion that the recommendations brought out by the replies to Circular 102, as above formulated, fairly represent the best block signal practice of to-day, and therefore presents them, but requires further information before it can recommend either a standard of signals to be used or a code of rules governing the same, which information the committee will continue to take steps to procure.

The Train Rule Committee recommend a few changes in the Standard Code, but the report was tabled.

The next autumn convention is to be held in Chicago.

The meeting passed a resolution thanking the Reception Committee which had been appointed by the Chicago roads.

Railroad Matters in Colombia.

BY S. B. M'CONNICO.

Having recently returned from the Republic of Colombia, where I spent the greater portion of last year, and having had ample opportunity of seeing and forming an opinion of a large part of that country, I think it may be interesting to the readers of the *Railroad Gazette* to know something from a practical observer of a country whose wealth and importance are too little known in the United States.

Lying directly south of New York and embracing nearly 18 deg. of latitude, to wit, from 10½ deg. north to about 5 deg. south of the equator, Colombia has an area of approximately 500,000 square miles and 4,000,000 of population. Within this large area is to be found every variety of climate, from the tropical coast sections to the perpetual snows and glaciers of the elevated regions of the interior. The great plain of Bogotá, according to Humboldt once the bed of an immense lake, having an elevation of nearly 9,000 ft. above the sea, is an example of perpetual spring time, the temperature there comparing at all times of the year with the month of May in New York. On this fertile and beautiful plain is situated Bogota, the capital, with its 150,000 inhabitants. The country is bisected from south to north by a noble river, the Magdalena, which, having its source in the heart of the Andes, flows with its 900 miles of navigable waters into the Caribbean Sea, where unfortunately its mouth is blocked to commerce by shifting sand bars, a fickle and constantly changing channel and heavy and dangerous surf. Tributary to this river is located three-fifths of the entire population of the country, whose only means of ingress and egress is by way of the Magdalena. The commerce now carried in and out of the country by this means amounted in the year 1891 to 70,000 tons of 2,240 lbs., and this will be immensely augmented as soon as better facilities are created for transporting the products of the country from the great trade-producing centres, which lie at varying distances, from 50 to 125 miles away on either side. The only really good harbor possessed by Colombia on its Atlantic sea coast is that of Cartagena, on the western coast of what may be called the Peninsula of Colombia, distant in a direct line about 45 miles from the Magdalena River, and opposite a point about 60 miles above its mouth. A description and map of the country were given in our issue of April 1, 1892.

The problem of the river traffic has been solved by a contract with an American company, which has undertaken to build a first-class railroad from Cartagena to the Magdalena, at a point called Calamar, and to construct superior modern wharves, warehouses and other terminal facilities both at the port and at the terminus on the river. The company which has undertaken this work comprises among its members a number of prominent and reputable capitalists and business men of the cities of Boston and New York. Among them may be mentioned T. Jefferson Coolidge, Fred. L. Ames, Oliver Ames, John L. Gardner, Albert W. Nickerson, J. Murray Forbes, Wm. H. Forbes, W. Powell Mason, Laurence Minot, Joseph S. Fay, Jr., Henry D. Hyde, Geo. V. L. Meyer, Henry Parkman, Allan Curtis, Thos. R. Wheelock, Fred. Ayer, Jas. B. Colgate, John A. Stewart, Morris K. Jesup, Gen. John Newton, Commodore Jas. D. Smith, Chas. R. Flint and others. This company, entitled the Cartagena-Magdalena Railway Company, commenced work in the early part of 1892, and at the present date has completed about one-half of the work, and is confidently expecting to open the line to traffic in the early part of 1894. On the completion of this road the traffic of the Magdalena River, which means the traffic of the entire interior of Colombia and of 2,500,000 of population, will inevitably pass through the port of Cartagena, and but a few years will be necessary to restore this historic and picturesque city to more than its former importance and prosperity.

The Cartagena Terminal & Improvement Company, Limited a separate corporation, but owned and controlled by the same interest, has a contract with the Government of Colombia for an exclusive privilege covering a period of 50 years to construct, own and operate wharves, tugs and lighters, and generally to do the harbor work at Cartagena. It has also the privilege for the same term of years of establishing a coaling station at Cartagena.

The railroads now existing in Colombia, besides the Panama railroad, are as follows: The Bolivar Railway which runs from Savanilla on the northern coast to Barranquilla on the Magdalena, distance about 18 miles; the Santa Marta Railway, which runs from the port of Santa Marta, about 25 miles in the interior, and is exclusively a fruit road; the Cucuta Railway, distance 33 miles, important and profitable as the carrier of the coffee and miscellaneous traffic of northeastern Colombia, all which will come to the Magdalena when the line is extended; the Antioquia Railway, of which about 30 miles has been built from Puerto Berrio on the Magdalena toward Medellin, and of which mention will be made further on; the Dorada Railway, which runs from Las Yeguas to Honda around the rapids of the upper Magdalena, distance 16 miles; the Giradot Railway commencing at Giradot on the Magdalena and running 25 miles in the direction of Bogotà; the Sabana Railway, commencing at Bogotà and running 25 miles in the direction of the river to the town of Facatativà, and the Cauca Railway, running from Buenaventura on the

Line of the Cartagena-Magdalena Railway—Colombia.
(Reprinted from the *Railroad Gazette* of April 1, 1892.)

Pacific Coast about 22 miles in the direction of Cali, a trading centre at the head of the great Cauca valley.

In addition to the Cartagena-Magdalena Railway, the following roads have been undertaken in the interior, to connect important centres of population and commerce with the Magdalena River: The Bogotà-Giradot Railway, to complete the connection between the river at Girardot and the capital. This is undertaken by capitalists and business men of Pittsburgh, and arrangements have been completed to begin work on the 15th of March. The distance between the two points is approximately 112 miles, of which about 50 miles are already built and in operation by the government. This road when completed will not only bring Bogotà into communication with the Magdalena, greatly stimulating the export and import traffic of the far interior, but will also bring into close commercial union the rich Departments of Tolima and southern Cauca on the west, with those of Cundinamarca and Boyaca on the east, whose interchange of products already even by mule trains exceeds 100,000 tons annually.

Next comes the Antioquia Railway, which is to bring the miping and commercial centre, Medillin, the richest in the Republic, into connection with the Magdalena at Puerto Berrio, distance 125 miles, of which 30 miles are already built and in operation by the government. This work is undertaken and operations have actually commenced by the well known house of Punchard, McTaggart, Lowther & Co., of London. Upon the completion of this road, there will no doubt be a great influx of gold seekers into Antioquia. Already Antioquia has contributed to the world more than $500,000,000 of gold, and she may easily double this sum under the influence of modern transportation facilities and improved methods of mining. Then we have the Bucaramanga Railway, undertaken by the same English house mentioned above, to connect Bucaramanga, the coffee and general commercial centre of Santander, with the Magdalena at Puerto Wilches. The length of this line will be 95 miles, all of which has been surveyed.

The three roads mentioned in the preceding paragraph are certain of construction in the immediate future. Then come, as *probabilities*, the Cucuta and the Ocaña railways, for both of which concessions have been issued and negotiations are now in progress. The first will bring into connection with the Magdalena the largest centre of coffee production and one of the most active commercial cities of Colombia (Cucuta), which now receives and exports annually about 30,000 tons of traffic by way of Maracaibo, a Venezuelan port, for lack of communication with the Rio Magdalena. All this traffic, several times multiplied, will come to the river as soon as the railroad is built, and, moreover, a cattle trade from the plains of Bolivar to Eastern Venezuela would immediately result. This road will be 113 miles long, and will also traverse a mining region. The second, or Ocaña Railway, will connect the Magdalena with another coffee mart and general trading point, which ranks next to Cucuta and Bucaramanga in the volume and value of its business. Other roads are talked of, but I do not mention them, as it is only necessary now to consider those that are practically certain of early construction.

This brings me to mention the navigation of the Magdalena, so important to the commerce of the country. For about 250 miles above its mouth, the channel is clear, broad and unobstructed, and the water deep enough at all seasons of the year to permit its navigation by vessels of almost any class and draft. Above this shoals and narrows and sharp turns have formed at many points, which make it impossible in the dry season for boats drawing over 4 ft. or longer than 175 ft. to navigate. There are now on the Magdalena 26 steamboats owned by various parties, and all are doing a profitable business, notwithstanding there is room for improvement in the methods of management. Future years will see this fleet improved both in number and character.

It may be interesting to show from official figures the increase in the commerce of Colombia, even under the existing absence of facilities. The following table shows the total imports and exports for the years 1888 to 1891, viz.:

	Importations.		Exportations.	
	Kilos.	Value.	Kilos.	Value.
1888....	26,357,737	$10,116,765	50,368,414	$15,576,614
1889.....	34,945,811	11,579,337	41,926,720	14,697,338
1890 ...	39,980,455	12,854,177	48,993 341	17,583,172
1891....	46,297,957	14,447,858	51,005,611	24,802,769

The revenues derived from duties on imports have been as follows:

1887.....	$4,795,266	1890.....	$8,626,732
1888.....	6,887,414	1891.....	9,503,989
1889.....	7,725,599		

The total import duties collected at the port of Cartagena during the four years from 1888 to 1891 inclusive showed an increase over the preceding four years of 344 per cent.

The steady improvement exhibited by the foregoing figures is due in great measure to the wise administration of the affairs of government under the leadership of Dr. Rafel Nuñez, who for the past 12 years has been its chief. It was my fortune while in Colombia to come into close business and personal contact not only with President Nuñez, but with Vice-President Caro, to whose charge are committed the executive functions of the government; Minister of Public Works Goenaga, as well as with other members of the Cabinet and subordinate officials, and I do not hesitate to declare my absolute belief in the good faith of Colombia in the performance of its contract obligations to the utmost limit of its power. No respectable foreigner need have the slightest fear on this score provided he performs within reasonable limits his side of the undertaking; moreover, I feel justified in saying that the present government of Colombia is especially friendly toward American enterprise and capital, and will gladly welcome them and bestow the fullest mead of encouragement.

The Emerald Car Cleaner.

Under the above head the American Chemical Company of Minneapolis, Minn., is putting on the markets a compound for general cleaning purposes, but specially intended for railroad use in connection with the cleaning of passenger coaches, dining and sleeping cars, etc. The compound is substantially a soap, and appears to have given satisfactory results on a number of different railroads on which it has been used during the past year, having been used for cleaning interior woodwork of cars, flooring, and furniture as well as the outside of cars without injuring the paint or varnish. For cleaning plush cushions, carpets, upholstered goods, curtains and other inside car accessories it is said to have been applied with similarly successful results, leaving both fabrics, and fast colors unharmed. One of the advantages of using the compound on the inside of coaches, aside from its efficiency as a cleaning agent, has been pointed out to be doing away with the excessive use of water, which naturally will find its way to the floor linings. When the space underneath the car floors is filled with shavings and chips these will absorb and retain much of the water and promote decay of the sills and framework Any such trouble is, of course, much diminished by the sparing use of water in cleaning. Where the cleaner is used on the exterior of cars it is said to leave the surfaces clean and bright, with an actually increased instead of diminished lustre. Still another point claimed in favor of the cleaner is that by its chemical properties it is a good disinfectant and deodorizer. This is represented as a purely vegetable compound with no acid admixture, so that it will not injure the skin.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

Only nine weeks ago the *Railroad Gazette* recorded the death of one of its editors, Arthur T. Woods; now it has to announce the death of another of its editorial staff, Deodatus Hilin Neale. Mr. Neale died in Brooklyn, where he has been living since last November, on Wednesday evening, April 5, the immediate cause of his death being cerebral meningitis. There are few men engaged in technical journalism in the United States whose names are better known than Mr. Neale's; in fact his personal acquaintance among railroad men was unusually large. He came to the United States in 1883 to represent *The Engineer* at the Chicago Exposition of Railway Appliances and in November of that year he joined the editorial staff of the *Railroad Gazette* where he remained until November, 1888 when he resigned to go to Sydney, New South Wales, as Mechanical Engineer to the Railway Commissioners. He returned to the United States in 1892 and rejoined the editorial staff of the *Railroad Gazette* last November. Although he has since then done a good deal of work as one of the editors of this journal, his principal occupation was, and would have been for sometime, in editing a new edition of the "Car Builder's Dictionary." Into this latter work he was carrying a remarkable store of varied and accurate information and he was doing it with a thoroughness as to details and definiteness and precision as to expression which characterized all of his work when he was working up to his normal standard. Mr. Neale was born in England, Sept. 5, 1849, and practiced there as a Mechanical Engineer for some years. He was at one time Chief Draughtsman of the London & North Western Railway and later went to Cape Colony as Assistant Locomotive Superintendent of the Colonial railroads. His long residence in America and his acquaintance with most of the best of mechanical officers of our railroads had made him a good American in many ways, and an important part of his work at Sydney was in forwarding the use on the Colonial railroads of American locomotives, Pullman cars and the Westinghouse air brake. In these matters he met with strenuous opposition, but he was successful in demonstrating the efficiency of the American locomotives that were ordered by the Commission after he went to Sydney, and in leading the Colonial authorities to admit the logical conclusions of the tests of the Westinghouse brake which were made there in 1890. We do not mean to say that Mr. Neale went to Sydney as a partisan of American methods or American machinery, or that he allowed himself to become so while there, but that the meritorious qualities of American railroad machinery found in him an able and staunch advocate at a critical time. Mr. Neale was an Associate Member of the Master Car Builders' Association in the United States, and had been for 20 years an Associate Member of the Institution of Civil Engineers of England. He was a man of studious habits and quite unusual intellectual gifts. He had a very keen mechanical faculty, good power of analysis, fair mathematical attainments and a mind which was instinctively and habitually active. Added to these gifts he had a remarkable faculty for using the English language. Few mechanical writers were so well endowed in this respect as Mr. Neale. He died in the maturity of his powers, and his death is a real loss not only to us but to the world.

Those who are looking for arguments to show the value of inspection of material for railroad companies need not look far to find some pretty substantial evidence. Here is a contribution to the long list: A prominent Western road ordered about 1,500 cars, and after the work had been commenced sent an inspector to look over the work. The inspector found about 4,000 car wheels already cast. Apparently they were good wheels, there being nothing on the surface to indicate bad material, but on putting them under a drop test it was found that they were not within 50 per cent. of the specifications; were not only unsafe, but really dangerous wheels to use. They were refused, of course, but not put into scrap as honesty would indicate, but were laid aside, and recently when the inspector next visited the same works he found these wheels being put under the cars of another road that did not send an inspector. The whole 4,000 dangerous wheels are now running under freight cars of another Western road. It will never be known just how much damage these wheels will cause before they are finally removed, but it is safe to say that the combined cost will be far greater than the first cost of the wheels. The losses caused by bad wheels are not borne entirely by the railroad company owning the cars, but are quite as likely to be inflicted on another company using the cars. As long as the present method of interchanging cars is in vogue, it is to the interest of all railroad companies to see that every individual company puts in safe axles, wheels and couplers.

All of this is just as much an argument for the inspection of car couplers as for wheels, and in this connection all railroad men should feel interested in what will take place in Chicago next week. What is contemplated will be found in another column, where are given the details of the coming tests. The tests are to be made under the auspices of the Western Railway Club, and the completeness of the plans commands respect; and possibly before the tests are over not a few of the coupler manufacturers and coupler sellers will go to work in earnest to discover some way of increasing the price of couplers so that a better malleable iron and a better cast steel can be used, as this alone will enable the couplers to meet the proposed test. Whatever is the outcome, it can but work great good to railroad companies, although it may result in hardship for some manufacturers. Which couplers are weak and of bad material is not now known, but what is known at present is that many couplers of good design have been built of such poor material as to bring discredit upon both malleable iron and cast steel couplers. Whether any coupler is made, weighing less than 220 lbs., of a material that will stand the proposed test will not be known until after the completion of next week's work. It is true that some few couplers have been made that were reported to stand the proposed M. C. B. test, but the tests were not of such an official nature as to remove all doubt. It may be that while the proposed pulling test is within reason and perhaps lower than may finally be required, yet the drop test may be too severe; but of this we shall all know more when we get Mr. Rhodes' report. In looking over the designs of the couplers that will enter the test, it is found that the principal suggestions about desirable changes in design brought out by service tests have been taken advantage of by recent designers, and this shows some of the uses of a thorough ventilation and discussion of current matters in technical journals.

In our last issue we stated that the New York Central and the Lake Shore & Michigan Southern are arranging to run a train from New York to Chicago in 19 hours, a reduction of six hours in the present fastest time. In direct contrast to this indication of faster schedules in the East is the agreement of the General Managers of lines in the Western Passenger Association fixing a minimum time for all regular trains. The question originated in the effort that was being made to agree upon rates for World's Fair traffic. A week or two ago the Burlington gave notice that it proposed to put on a limited train between Chicago and St. Paul to make the time in 12 hours. Other lines protested against this and stated that their protection must be in lower rates. It transpirep that the Burlington's attempt to put on a limited train between Chicago and St. Paul was due to an impression that the Chicago, Milwaukee & St. Paul was intending to shorten the time between the two cities, but was glad to desist if such were not the intention of the St. Paul road. The matter was settled by fixing a minimum time for all regular trains, no road to be permitted to run trains at a higher speed. The minimum time for trains between Chicago and Missouri River points, Kansas to Omaha inclusive, was fixed at 16 hours, and the minimum time of trains between Chicago and St. Paul was fixed at 13 hours and 20 minutes. This will necessitate the lengthening of time by some of the roads and the shortening by others. The time between Chicago and Kansas City by the direct lines is lengthened by one hour. The roads expect much benefit from this during the World's Fair period, as it will permit them to haul heavier trains at less risk. It has struck us all along that this is a bad year to increase speeds. The greater train movement will increase risks; it will cost more for protection and in operating expenses to run fast trains; rates are sure to be reduced, and the gains will be merely in advertising, which the railroads do not need this year. Let them try to make a little money now and to carry their big traffic safely, comfortably and economically.

The Supreme Court of Alabama issued a just and reasonable decision in a case reported in our Railroad Law column in this issue (the 13th case). When a train is running on a curve where the engineman cannot see the road ahead, the fireman is required to keep a lookout. It is quite likely that the engineman could have got a good view ahead if he had tried to do so, and we might argue at considerable length about the desirability of having him trained to proper vigilance in this matter; but the decision is pretty good law, nevertheless. The judge, no doubt, took an arbitrary view of some aspects of the case, and very likely paid scant respect to the fireman's claim thas he was exceedingly busy just then, shoveling coal into the firebox (We assume, *of course*, that that defense was offered; it always is). But it is well to have the law laid down with plainness, and lives and property would occasionally be saved if this decision were adopted as law by every division superintendent. In short, the simple rule that the fireman shall keep a good lookout every instant that the engineman does not, needs a good deal of "jacking up" on every road. This without regard to the other important matter of having *both* engineman and fireman watch for all fixed signals. The same court passed upon another important question in the 23d case. A road which does not use "due diligence" to promote uniformity of car couplers is guilty of a certain negligence, speaking from an ethical point of view, and probably enough lawsuits will go against such roads to spur them up to their duty, but it is right that the courts should warn brakemen and their shyster lawyers that the law will not take the railroad's money to poultice their feelings when the cars used are up to "the existing state of the art;" that is, when the road keeps its couplings in as good shape as they are kept on the average of well managed roads. As most of these suits turn largely on questions of fact which have to be settled by juries, we need have no fear that brakemen will suffer much injustice. As our Railroad Law is set in solid type, not many readers, we presume, turn to it for humorous reading; but lawyers present such absurd claims when trying to get money for their poor clients out of the rich railroads that ridiculous features very often appear. One such case may be found in the 21st case to-day. The tragic circumstances of such a case forbid one to laugh, but we should think the dignity of the Court must have been more or less ruffled. We have heard of passengers digging holes in a station platform so as to run a leg through and get it broken, but the brakeman who goes to sleep on the track so as to get the better of the company goes to the head of the class.

The Recent Injunction Cases.

It cannot be denied that the last twelvemonth has produced a very interesting group of cases which surely mark a great advance into the domain of unattempted remedies. Those who had concluded that new remedies for new abuses had to be created by the law-making power will have to recast their conclusions in the light of the decisions ranging from the Reading case to that of the petition of the locomotive engineers in the Georgia Central matter. In all of these cases the extraordinary powers of courts of equity were brought into requisition, and, so far as appears, their intervention, whether constitutional or not from the standpoint of a doctrinaire, whether justifiable or not as a matter of equity or discretion, seem to have paralyzed the evils they sought to check.

When Chancellor McGill in New Jersey opened his powerful battery upon the Reading combination, it was confidently given out from rather authoritative sources that it would have no effect upon the plans

which that combination had in contemplation. But, as was pointed out in these columns at the time, the process of injunction is a dangerous thing to fool with, and its power of penetration into the very essence of things is too formidable to be lightly disregarded. The operation of this remedy has been so quietly efficacious that it has directly or indirectly demolished the great coal combination without either a cataclysm or a revolution. If one could photograph the situation now he would see the débris of leases, shattered schemes, receivership, presidential resignations and retirement of receiver, and, high over all, the Chancellor, solemn, implacable, but calm.

The decision in the Reading case was followed by numerous unfriendly criticisms from individuals of high financial standing whose feelings were lacerated from disappointment over the miscarriage of profitable schemes, while labor unions throughout the country exploded with resolutions of applause, and Chancellor McGill was, so to speak, for the time being, the coming man in labor circles. In this case it was the people against the coal combination. The people had the right of the contest, and the people won. It was a triumph for labor, and labor enjoyed the triumph.

But the echoes of labor's exultations had hardly ceased, before Equity was again lifting her strong arm and striking down another evil. This time Judges Ricks and Taft were her ministers; Ohio, the scene of operations, and Rule 12 of the Brotherhood of Locomotive Engineers the immediate *casus belli*. Those that exulted before now breathed out threatenings and slaughter, with occasional lamentations; while the other class, that were but recently bowed down with woe, thanked their stars and took courage. The daily press has been filled with interviews, in which many discordant opinions have been expressed and the oracle of labor prophesies different things from the oracle of capital. But over all the din and confusion Equity presides serene and powerful, issuing her mandate that Lennon must pay his fine for contempt of her process and that Arthur must revoke his obnoxious rule, or they go to prison. Her intervention is again efficacious. A great public nuisance is abated and irreparable wrong prevented.

When Mr. Porter, of the amalgamated council of the labor unions in New Orleans, proposed to perpetuate by force the paralysis of trade and transportation inaugurated by them in that city, he did not reckon upon the interference of Judge Billings, of the Circuit Court, and there was a breach left in the proposal which all the resources of the amalgamated council were unable to fill. Here once more Equity came to the rescue, and the federated associations were effectually forbidden to pursue a course at once against the low and abhorrent to good conscience.

Passing by the contest in New York City, of the cloth cutters against the manufacturers, which terminated technically and perhaps justly against the manufacturers, as the evidence was presented, the most recent decision of this general character where a court of equity was appealed to in the controversy between labor and capital is that of Judge Speer, of the United States Court, at Macon, Ga., in a case where the Brotherhood of Locomotive Engineers petitioned the court to require the Receiver of the Central Railroad of Georgia to enter into a contract with that organization for the services of its members. The questions thus presented were, among others, whether the Court would recognize the existence of the Brotherhood and incidentally its constitution and rules, Rule 12 along with others, and, if so, whether it could or would authorize a contract of the kind sought for. To sanction any such arrangement would give the Brotherhood a distinct standing in Court, and so far would be an approval of the objects of its formation and a judicial confirmation of its methods of procedure. So far as appears, the contract asked for does not seem to have been substantially objectionable to the Receiver, or to have been inherently unreasonable, but it was argued on his behalf that the Court by sanctioning the proposed arrangement would make as a part of the contract the obnoxious rule 12, and thereby uphold the Brotherhood in its observance of that rule whenever the occasion for its operation arose. The decision of the Court recognized the soundness of this argument by authorizing the contract, provided this rule should be abandoned, which appears to have been agreed to.

The engineers have reason to be gratified over this result. And so has the general public. The recognition of the lawful objects of this order is not only unobjectionable, but eminently advantageous to the road and the public generally. The court of equity sees no harm in the organization of the engineers to accomplish what is lawful in a lawful way; on the other hand it distinctly repudiates and rebukes the claim that any association can violate the law by resorting to boycott or any kindred conspiracy. The attack upon Judge Speer on the ground of personal interest in the result of his decision is quite apart from the soundness of his views on the subject under consideration and it is not our present purpose to examine that matter. The firm but considerate language of the judge points out to the engineers the way in which their real wrongs may be legally redressed, and leaves no excuse for those lawless and senseless proceedings which have sometimes stained the history of their order. It is made to appear that a court of equity is as swift and strong to intervene in their favor as it is in the favor of their employers; but in every instance he who would come into equity must come with clean hands and a righteous cause.

It is right here that the touchstone lies that can call into play this beneficent jurisdiction. And the just mind will view with satisfaction its exercise, whether it be now upon the petition of labor or now of capital. Its peculiar efficacy proceeds from the individuality and directness of its process as well as from the scrutiny with which it investigates and the skill with which it detects and disregards forms and evasions of every kind. In dealing with the complex questions of our social fabric, it is well equipped by a trained conscience and an intelligence sharpened to the keenest edge. Possessed of the boldness to exercise its irresistible powers, this tribunal has in it the potency and promise of relief from much that the long-suffering public has often experienced with patience but without hope.

Railroad Mortgages and Earnings.

A circular of the Cleveland, Cincinnati, Chicago & St. Louis announces the issue of a blanket mortgage for $50,000,000, of which $29,000,000 shall be reserved to retire the present divisional bonds of the system, leaving $31,000,000 available for improvements. Five million dollars, bearing four per cent. interest, it is proposed shall be sold to cover outlays for construction already made or in progress, the remaining bonds to be sold hereafter in amounts not exceeding $1,000,000 in any one year. The directors find that the 10 different roads consolidated into the present system need for their economical operation additional terminals, double tracking, sidings, yards, shops, and roundhouses; 60 engines have been purchased, and 50 more are required. New passenger and freight cars have been ordered. All these additions and improvement cost money, and must be paid from new capital if dividends are to be the continued. It is beleived by the directors that, after the improvements now under consideration are completed, the road can be operated on a basis of not over 70 per cent., the ratio for 1892 being something over 72 per cent. Traffic, it is thought, is certain on that percentage to be sufficient for fixed charges and dividends.

This action of the "Big Four" company is an illustration of the prevailing tendency in well managed railroads to reduce operating expenses through a judicious spending of money. So many roads would not adopt this policy if the managers did not believe that economies could thus be really introduced. President Haines, in his address printed in another column, does not see how operating expenses can be much further reduced, but he refers principally to savings arising from better cars and engines. A system like the C., C., C. & St. L., made up of a number of smaller roads, ought to be able to save money by improvements which shall allow of a better working of the parts as a whole. As our large railroad systems are made up of smaller parts, no doubt savings can be made in this general direction for some time to come. The Pennsylvania Railroad, it is reported, spent $21,000,000 on its lines east and west of Pittsburgh, and for car trusts in 1892. Such large sums expended by the Pennsylvania must compel all other companies in its territory to improve their properties to a greater or less extent, or fall behind the new standard. Increases of traffic must also be provided for. In general, a railroad property is well managed if it uses its capital so that its net earnings increase a little faster than its fixed charges.

In connection with this expected and constant increase in annual interest charges, the tendency of average freight rates to fall is a cause for serious apprehension. The presidents of some of the Western railroads have lately written pamphlets upon the subject, principally upon the wages side of the question. Leaving that subject aside for the present, it is plain that the continually increasing ratio of expenses to earnings must be ascribed in part, we should say very largely, to a decline in average charges. It behooves all railroads to look seriously into the matter of tariffs, public and special. The whole complicated subject of agreements as to rates is one not easily arranged satisfactorily, yet the necessity for harmony has lately impressed itself upon railroad men as never before. Meanwhile there is a large field open for detailed examination. Instances are known where tonnage has been accepted at rates which left nothing for hauling after fixed expenses for terminals or the like had been paid, or where passengers have been secured at a cost which gave the carrier no returns. It is a good time for traffic managers to look into the question of profitableness of special traffic.

The matter of capital expenditures brings up another point: How far should a road improve its terminals and sidetracks for the sake of carrying still larger quantities of cheap freight? If a company is moving say 50 trains a day over its road, but has engines, cars and yard room to handle 60 trains, it is good economy to secure 10 additional trains of soft coal or other cheap traffic at any reasonable rate. But when, let us say 50 trains of this low-class freight are offering, is it good policy for the company to borrow money largely in order to put in sidetracks and buy more equipment and expensive terminals, so that these additional trains can be run? It is the habit to make much of the principle first stated, but the result often is that a great part of a road's business grows to be of a character paying but little into the treasury, while the funded or floating debt becomes a load whose annual burden is very heavy. These points are mentioned as suggesting that there is in the ever present problem of rates much more than the question of pooling. All are agreed that there must be some relation between capital and earnings. For several years the railroads have been tending toward operating economies to be reached through the expenditure of new capital. It is a grave question whether the time has not arrived for a closer study of the traffic to be carried, and whether we are not neutralizing this saving of expenses by the cheaper freights and the lower general average of rates thus introduced.

An Episode in New York Rapid Transit.

The patient citizens of New York have just been made the victims of a queer performance on the part of some of their Rapid Transit Commissioners. When the franchise for the underground rapid transit railroad was offered at public sale without a single bid it was demonstrated that that railroad at least could not be built by private enterprise. It was proved that private capital could not be got for the Commissioners' project. This had been the opinion of many cool-headed and thorough investigators for a good while, but the experiment had to be carried to demonstration.

The next obvious step was to get immediate relief by improvement and extension of the existing elevated railroads, awaiting the evolution of some possible independent system; and propositions and counter-propositions went on between the Commissioners and the Manhattan company with a fair prospect of agreement on a workable plan. Suddenly one of the Commissioners came forward with the assertion that capitalists were ready to build the underground railroad, and for a week everyone stood still, waiting for those capitalists to prepare and present their offer. Finally, it was made, and it sounds almost child like, it is so inadequate and it so impracticable. These are the two propositions:

First—We and our associates will form a corporation with a cash capital of $15,000,000 to build the proposed railroad for the account of the city, the city paying 70 per cent. of the actual cash cost of the same in its bonds at par, upon the condition that the city will contract to sell to said corporation, or to another corporation to be formed, the railroad after it shall have been built, at a price equal to the bonded indebtedness incurred by the city in the construction of the same, and accept payment therefore by the purchasing corporation assuming the payment of the principal and interest of said bonds of the city; which bonds shall constitute a first mortgage lien on all the property of the corporation.

Second—We and our associates will form a corporation to purchase a franchise under which said corporation will build, own and operate that part of the proposed route from the battery up Broadway to Fourteenth street, including the loop to the Brooklyn Bridge, upon the condition that the city shall build from Fourteenth street to 190th street, or to the city limits at its discretion, and also the branch from Fourteenth street up Fourth avenue to the Grand Central station, as outlined in your plan, and, when completed, shall sell such portion built by it to the corporation for a sum equal to the total amount of bonds issued by the city for the construction of the same, and accept payment therefor by said corporation assuming the payment of the principal and interest of the bonds of the city in the manner stated by the previous proposition.

The gentlemen who made these propositions ought to have known, and probably did know, the commissioner who fathered the matter certainly knew,

(1.) That a question would at once arise as to the constitutionality of either plan and that delay was certain and defeat probable on this ground.

(2.) That in any event additional legislation would be required and that delay was certain, and defeat almost certain, on this ground.

(3.) That it is pure assumption to say that the railroad can be built and equipped for $50,000,000; that the estimates of good judges have been as high as

$100,000,000; that $75,000,000 has been taken as a very fair estimate of the cost. But these same capitalists who ask the city's aid do so because the road cannot earn six per cent. on $50,000,000 and must be financed at a very low rate. Then it cannot earn three per cent. on $100,000,000, or four per cent. on $75,000,000, and by their own showing it cannot pay interest on its probable (not its assumed) cost.

(4.) That it is by no means certain that the city's bonds for $35,000,000 can be floated at par at 3 per cent. interest; and so again the fixed charges may easily be more than can be earned.

It follows then that the bankers who made these propositions, and the Commissioner who has stopped all progress by the Board for ten days, must have known that they were proposing something that had 99 chances to fail against one to succeed. They are all astute business men, and cannot "plead the baby act." It is a matter of record that on March 30 Manhattan stock sold at 169. April 1 the Commissioners and the public were informed that a group of capitalists stood ready to build the underground railroad; not that they were going to ask the city s aid, but were ready to buy the franchise and build. The quotations and sales of Manhattan stock were for a few days before and after this announcement as below :

Date.	Shares sold.	Highest.	Lowest.
March 27	3,973	171	167¾
March 28	3,905	172¼	169½
March 29	1,000	171	170
March 30	2,860	170	169
April 1	1,700	169	167¾
Announcement made that capitalists would build the underground.			
April 3	7,705	166	159
April 4	3,645	164	160½
April 5	1,401	165½	162½
April 6	3,114	167	164
April 7	410	166	164½
April 8	3,655	165	161½
April 10	4,155	165	162½
April 11	2,477	164¾	163¾
April 12	1,675	166½	165

The afternoon of April 12 the Commissioners voted to allow the Manhattan very important privileges in the way of extensions and additional tracks, and the opening quotation on the 13th was 169, which advanced to 170½ before 11 o'clock.

There are some interesting coincidences in the story of those few days ; and we fear that the confidence of the citizens of New York in the judgment of some of their Rapid Transit Commissioners has not been strengthened. At least, there is a chance for explanations.

Chances of a Freight Blockade at Jackson Park.

Until recently it has been thought by the World's Fair officials that the switching and car storing facilities at Jackson Park were sufficient to insure the quick handling of at least 500 cars a day; during the last week however, an unexpected condition of affairs has developed which is likely to prove a vexing problem for the Chief of the Traffic Department. This unlooked-for difficulty is directly due to the carelessness of American exhibitors in not properly billing their cars, and to the railroad companies in accepting and forwarding such cars.

Months ago the management of the Fair sent out instructions to intending exhibitors, stating particularly that all cars of exhibits consigned to the Fair should have cards attached specifying the building for which the exhibit was intended and the space in that building allotted to that particular exhibit. These same particulars were to have been given on the waybills. Instructions were issued to the railroad companies clearly stating how cars destined to Jackson Park should be billed.

Many American exhibitors have ignored these instructions, and so have the railroads, and the roads that do not have terminals in Chicago have ignored the instructions of their Chicago connections, and unless immediate action is taken and some remedy devised at once, a blockade of freight cars is certain to occur at the Exposition grounds. Whole trains of cars are arriving at the grounds consigned to the Director General, World's Fair, with nothing to show the nature of the exhibit or the building for which intended, and as many exhibitors will have displays in several of the buildings, the name of the exhibitor furnishes no clue to the building for which the car is intended. When such cars arrive in the switching yards at the Park, the officials exhaust every means of determining where the exhibit belongs, and then shift the car as far out of the way as possible till further information can be obtained concerning its ultimate destination. So many of these cars have already been received that the question of their disposal is becoming a serious matter. The officials recognize the fact that if a blockade is allowed to occur, the placing of the exhibits can not be completed till several weeks after the opening. It was estimated on April 5 that 7,500 cars would arrive by May 1; this gives an average of 300 cars a day. The capacity of the tracks at the grounds is 2,000, and to keep the tracks clear it is necessary that all cars be handled as expeditiously as possible.

There is one course still open to the officials of the Fair to prevent a blockade on the tracks inside the grounds, and that is to refuse to accept from the railroad companies any cars that are not properly marked ; such a ruling is being seriously entertained by the Traffic Department. This might delay the placing of the exhibits not properly marked till after May 1, but any inconvenience this might cause to exhibitors will fall on those causing it.

Foreign exhibitors have followed the shipping directions very precisely, and as a result cars containing such exhibits can be quickly placed just where each belongs and there is no delay.

It has been found that the single track around each building is not sufficient to expedite placing cars as much as could be wished, and that had spurs been provided at various places they would have been very convenient for storing loaded cars near the place at which they are to be unloaded, and the work of placing the exhibits could have gone on uninterruptedly. If the exhibits are to be placed by May 1 everything must be done to assist the Traffic Department in its operations, and the railroads and American exhibitors must follow closely the shipping directions furnished to them months ago.

The Russian Ministry of Transportation has recently published some interesting facts concerning internal navigation in the empire, comparing the statistics for 1890 with those for 1886 and 1884. According to this the number and capacity of the vessels has been :

	1884.	1886.	1890.
Steamboats:			
Number	1,246	1,507	1,824
Tonnage	98,700	102,061	149,228
" average	79	67	82
Horse-power	72,105	86,404	103,177
" average	58	57	57
Other Craft:			
Number	20,095	.....	20,125
Tonnage	5,860,300	.....	6,492,692
" average	292	.....	323

The very small average capacity of the steam vessels indicates that the greater part of them were towboats, which is also indicated by their cost, which was (reckoning the fluctuating ruble at 50 cents) $248 per ton of capacity in 1884, $197 in 1886, and $217 in 1890, while the average cost of the other craft—largely flats, doubtless—was only $2.75 per ton in 1884 and $2.95 in 1890. The men employed on these vessels were:

	1884.	1886.	1890.
Steamboats	18,766	23,069	25,814
Av. per vessel	15 0	15.3	14.2
Other craft	94,099	.....	99,366
Av. per vessel	4.7	.....	4.5

Probably the most interesting fact shown by these statistics is the change in the kind of fuel used on the steam vessels. The consumption in the several years was :

	1884.	1886.	1890.
Wood, cords	742,121	801,025	598,897
Coal, tons	158,136	182,881	279,680
Petroleum residuum, tons	214,915	276,237	563,113

Thus with an increase since 1884 of 43 per cent. in the horse-power of the steamers, there was a decrease of 19 per cent. in the wood consumed, an increase of 76 per cent. in the coal, and of no less than 164 per cent. in the petroleum waste. The latter in steam-making capacity probably exceeded both the coal and the wood used in 1890. The advantage of using it is illustrated by the statement that while a tug can carry a supply of wood fuel for only two or three days, and requires 6 to 12 hours to take it on, it can carry 8 to 12 days' supply of petroleum, and can take it on in from 3 to 6 hours. It is in such uses as this, rather than from its exports, that Russia is finding great advantage in its petroleum production.

A bill has been introduced in the New York Legislature to abolish the Buffalo Grade Crossing Commission. It appears that this bill has been drawn up at the instance of an association of citizens in East Buffalo. These citizens say that they are not opposed to the general movement and that their object is simply to improve the details of administration, but the Buffalo newspapers are much exercised over the bill and seem to fear that the railroads have got the citizens to start this movement in order to delay the important changes in grade which have been so long under consideration. The manifesto of the Citizens' Association seems to be a pretty strong one, however. They demand that the present Commission, being composed of citizens without technical training, who serve without pay, shall be supplanted by a board of properly qualified men, to be paid for their services. The document also sets forth considerable criticism of the provisions of the present law for indemnifying property holders.

The production of anthracite in the Donez basin of Russia, though still small compared with that of coal-fields familiar to us, has increased greatly of late years, and in 1892 amounted to 2,560,000 long tons, an increase of 18 per cent. over the production of 1891, and of 27 per cent. over that of 1890. In 1880 the production was 620,000 tons, in 1885 1,150,000, and even as late as 1888 only 1,380,000. Last year the prevalence of cholera caused an important check to the production from August till the middle of October. This year the mines are estimated to be able to produce 3,660,000 tons; but there wil be great difficulty in getting so much carried.

Western Railway Club Coupler Tests.

In the issue of the *Railroad Gazette* of March 31, mention was made of a paper to be read before the Western Railway Club by Mr. Godfrey W. Rhodes on car coupler tests. It was expected that this paper would be read at the meeting of the Club to be held April 18, 1893, but the tests have been so elaborated from the original intention, that it will be impossible to make them in time for the result to be given at this month's meeting.

As arranged now, there will be a pulling test and a drop test; the pulling tests to begin April 17 at 7 a. m., and continue until completed. It is expected that this will take two days. These tests will be made on the Riehlé Brothers' 200,000 pound test machine in Machinery Hall at the World's Fair grounds. The drop tests will be made beginning April 18 at 7:30 a. m., and continue until completed. They will be made at the Sargent Company's works, Fifty-ninth and Wallace streets, Chicago. Both the pulling and drop tests will be under the supervision of R. W. Hunt & Co.

The proposed M. C. B. specifications for coupler tests will govern these tests. Excepting in the drop and the lug tests, the couplers will not be tested to destruction. In addition to the test proposed by the M. C. B. specifications, there will be what is called a single lug test, to be made as follows: The upper lug of one bar will be coupled to the lower lug of the other and pulled to destruction. If time will allow, new knuckles will then be inserted and the bars pulled to destruction under tests proposed by the M. C. B. specifications.

In the drop tests arrangements will be made to practically cover the guard arm tests, recommended by the committtee of the M. C. B. Association. Paragraphs 2 and 3 of the recommended additional tests will be omitted.

A description of each coupler will be given in the report, giving the weight of each coupler offered for tests, including the knuckle and locking device, the number of parts in each coupler, including every washer, pin or key, and it will be stated whether or not the coupler tested conforms in contour lines to the M. C. B. standard All parts, after they have been subjected to tests, will be photographed, and special care taken to bring out any parts that fail.

Each company entering the tests will be required to give the following information :

(a.) The kind of material in the drawbar.
(b.) The kind of material in knuckle.
(c.) The kind of material in lock.
(d.) The kind of material in knuckle pin.
(e.) State whether the couplers were specially made for test purposes.

Note.—The committee does not object to having couplers made specially for testing.

(f.) State if the couplers are supposed to represent the average product of what is manufactured.
(g.) If the couplers are second-hand and have been taken from service, state how long they have been in service.
(h.) If parts of the couplers are made of steel, state whether made by the Bessemer or open-hearth process, and give the percentage of carbon in the steel.
(i.) A few extra knuckles should accompany the couplers.

Members of the Western Railway Club and owners of couplers to be tested can obtain cards of admission to Machinery Hall by applying to C. F. Street, Secretary Western Railway Club.

The Ethics of Engineering.

At the March meeting of the Boston Society of Civil Engineers there was what we might call a "symposium" on the relations of eogineers to each other, to their clients and to the general public. Addresses were made or papers read by several members of the Society, and we are permitted to begin in this issue the publication of what those gentlemen said. We have taken the liberty of condensing a few passages slightly.

DESMOND FITZGERALD.—THE RELATION OF THE ENGINEER TO HIS BROTHER ENGINEER.

At the last annual meeting of the Am. Soc. C. E. the writer had the pleasure of assisting in the passage of a resolution asking the Board of Directors to inquire into the advisability of adopting a Code of Ethics and to report thereon.

The importance of this question becomes more apparent the longer and the more faithfully we study the present condition of the profession of the civil engineer in this country and the relations of the engineer to his brother engineer. To those who are contented with the present status any appeal looking toward improvement will be made in vain, but happily there are many who are animated with the laudable ambition of seeing their profession take the same rank that it does in those countries where it is looked upon as the very foremost among the learned professions.

It appears at first glance that no other code or rule of action can be necessary than that common rule which should be observed by all men in their relations to each other, known as the golden rule. "Whatever ye would that men should do to you, do ye even so to them." This is of course all comprehensive. Unfortunately it has been found by experience that in the complicated relations of modern civilization—with the mad strife for position, honors and pecuniary rewards—certain laws, constitutions, rules and regulations, specific in character, are necessary to form bonds of union and standards of conduct. One of the advantages of having some code is that when framed by the deliberate and well considered thought of men of wisdom and experience it necessarily has an influence on actions, which, without it, might, in the haste of the passing moment and without due consideration, prove injurious to our fellow men and unworthy a high standard of professional honor.

Disagreeable as it may appear to contemplate, we must, neverthless, acknowledge the truth of the asser-

tion, so often made, that in this country the professions of law, medicine and theology far outrank that of the engineer in the public mind. May it not be that one of the reasons for this difference arises from the fact that these professions have cert ain defined rules of conduct, or codes of ethics, which tend to give them a high place in the esteem of the community?

Let us look for a moment at the profession of medicine. The writer has abstracted from the Code of Ethics which serves as a guide to the Massachusetts Medical Society the following articles bearing upon the relations of the physician to his brother professinal.

IV. The relation of the physician to other practitioners and to their patients.

In his relations with another medical practitioner and his patients, a physician should be governed by strict rules of honor and courtesy.

His conduct should be such as, if universally imitated, would insure the mutual confidence of all medical practitioners.

The foregoing rule should be a sufficient guide of action.

Some of the following contingencies will illustrate its application:

1. A physician should take no step with a view directly or indirectly to direct to himself the patient or practice of another physician.

2. If formally requested to assume charge of a patient or family usually attended by another physician, he should consent to do so only after notifying the latter—unless the case be one of pressing necessity.

3. If a physician is called to a patient during the temporary absence or illness of the usual physician, or in case of accident or other emergency, he should direct that the former be sent for as soon as he is able to take charge of the case, and should then relinquish it to him. It is generally agreed that, among several physicians thus called, he who first arrives shall act, unless the family designate another.

4. A communication from the temporary to the usual physician, in the absence of the latter, should be written and sealed, and not simply verbal.

VI. Consultations.—Consultations should be encouraged in cases of unusual responsibility or doubt.

A consultation is called for the benefit of the patient, and to give him the advantage of collective skill. Should there be a difference of opinion, discussion should be temperate, and always confidential.

A consulting physician should be careful to say or do nothing to impair the confidence of the patient or his family in the attending physician.

Does anyone doubt that the observance of these rules tends to elevate the profession of medicine? It seems to the writer perfectly plain that a body of men who thus have the wisdom to respect themselves must win the respect of others. The honors and emoluments which, as is well known, attend the diligent practice of medicine, follow as a matter of course.

Some men of high rank in engineering go so far as to proclaim openly that there is no such thing as a profession of engineering, and that while men continue to work for a salary there never can be one. This was asserted at the annual meeting already referred to. We may well wonder why there should be one rule in this respect applicable to the clergy and another to the engineer. If we throw overboard all pretensions to a profession what have we left? Shall we degrade our science to the level of a trade?

Let us glance for a moment at some of the more glaring evils that now surround the ordinary practice of the engineer, so far as his relation to his brother is concerned. First in importance may be placed the strife to secure work that properly belongs to another. Secondly, jealousy of the success of others. Thirdly, ungentlemanly treatment of subordinates.

It is hardly necessary to cite cases where engineers high in the ranks openly solicit employment, or by some indirect method endeavor to capture work which would naturally go to another. Probably every engineer will recall plenty of examples from his own experience. Such conduct is hardly compatible with that high sense of honor which ought to animate every professional man. Not only is the respect of the community lost by these means, but the ultimate rewards, which every one should attempt to raise in a proper manner, must be very much lowered.

It is undoubtedly true that many men should have the credit of transgressing in this regard through actual ignorance rather than from a desire to secure work at the expense of others and of the profession. It is easy in the absence of formulated rules of guidance to fall into the methods of the traveling salesman or the subscription canvasser. The result is often that the public get their engineering advice for next to nothing, and sometimes their plans for one-half the cost of a proper preparation. The writer believes that prices would naturally rise to a point nearer their proper level and all members of the profession would be much benefited if the lines were drawn a little tighter around the relations of the engineer to his professional brother.

In regard to jealousies which arise in the profession, the writer can only say that criticisms of one engineer by another, are, in his judgment, far too common. Unless improper methods are used in the conduct of business, every engineer should be careful to abstain from adverse remarks in regard to his brother, because such remarks may possibly injure him in his business. It has not infrequently happened that the most malicious stories have been started by some one calling himself a civil engineer, prompted by jealousy of the success of another. We should really remember in this connection that the higher any rival climbs in the esteem of the public, the greater become the chances for us to attain the same success.

The writer was once thrown in his earlier professional life under the charge of an engineer whose great delight consisted in hurling volleys of oaths at his assistants and treating them like a lot of inferior beings. Happily this type is fast passing away. Such conduct neither produces the most work, nor accomplishes the best results. It was, however, a type often met with in the earlier days of engineering, and generally found hand in hand with ignorance and rule of thumb methods. Can we wonder that with such examples before them men have grown to mistake cheek for business aptitude? In this connection the following story may not be altogether out of place: An eminent landscape gardener not long ago had occasion to employ a young engineer to assist in laying out a certain work, and in order to familiarize him with stock phrases used by this branch of the profession took him for one day to a public park and pointed out certain features in order that he might understand the meaning attached to his instructions. On the strength of this one day's apprenticeship in an art that was new to him, the young man soon afterward added to his title that of landscape architect, and furthermore had the audacity to send the advertisement to his employer. In this advertisement he described himself as having been the pupil of this eminent and experienced practitioner. The man was, of course, nothing more nor less than a quack. He had never learned his profession, and was simply trying to take a short cut for practice in a profession requiring years of preparation and hard study.

A fitness to fill the duties of a civil engineer does not by any means depend upon a college education. That such preparation aids materially in success none will deny; but we cannot lose sight of the fact that many of the brightest lights in the profession have been men who, after a proper period spent as pupils or assistants, have by continuous study all their lives, achieved the highest results. It is needless to say that such men are not found guilty of the petty meanness of pulling others down while mounting the ladder themselves.

Whether it is best for American engineers to be guided by some written code of ethics, the united wisdom of the profession will undoubtedly determine. If proper rules should be adopted, it is evident that aside from their usefulness to the profession, they will be a desirable aid to the public in their dealings with the civil engineer.

AUGUSTUS W. LOCKE.—THE ENGINEER IN HIS RELATIONS TO HIS CLIENTS.

Here we find a large body of educated men; all of them have given years of time and study and effort to qualify themselves to do their work. They are faithful to their trusts. Who ever heard of an engineer accepting a bribe? They are almost never accused of enriching themselves at the public expense. Indeed, they seldom enrich themselves at all. After controlling the disbursement of millions, they generally go to their long homes leaving little behind them except untarnished names. It is not for lack of opportunity, and the temptations are not wanting, but the class of men who adhere to the engineering profession are of those who expect to work and render an equivalent for what they get rather than to succeed by gaining an advantage over others by deception.

The results of the engineer's labors are expected by his clients to be absolutely accurate. His work has got to turn out as he says it will turn out, or else he runs the risk of losing his reputation. He is expected to do accurate work and furnish accurate opinions, and he does it even though it be a new and unknown matter. Where else are there any such acquirements or any such results? I do not know where to look for a parallel. Brilliant as have been the efforts of men in other professions, yet we may see that the earth is strewn with the disastrous results of their mistakes.

The engineer has a very high reputation for fairness and a capacity to render wise and just decisions. The contractor voluntarily puts all his interests into his hands, although he is in the employ and pay of the other party in the controversy and the points of dispute are in the beginning entirely unknown.

Such is the engineer's character and such the service rendered by him to his clients and to the world at large; but I venture to say that his position in the world's procession is not what it ought to be and he does not in my opinion receive his just share of the wealth which his labor creates. The boasted progress and material advancement of the present age are to a great extent dependent upon him; without him many things would come to a stop. Take away the results of his labors and what have you left? But for all that nobody hunts him out to confer political honors on him, nor even when questions which he only can decide are involved do we find state or national governments by any means in a hurry to seek him out and place him in charge of the question. He often gets left out when matters in his own field are being decided, and as for calling on him to decide any case outside of his own sphere probably it is seldom heard of. Commissions for deciding and administering engineering questions are often made up without him and he is called in to perform the humble duty of doing their work for them. Where he holds official position the tendency is too much to curtail his authority, so that he too seldom stands as the executive head of a department responsible only for results and having control of all labor and material. There is where he should stand always. He is trained to know the reason of things, and to do all work the most economical way and to use labor to the best advantage; and he can do all these better than anybody else if he is what he ought to be. And furthermore he is certain to be a stumbling block in the way of the official boodler.

As to pay there has certainly been a great improvement since the middle of the last century, when the great Brindly was building English canals at three shillings a day; but I venture the opinion that the financial return which the engineer receives is not what it ought to be considering the severe and exacting nature of his duties, and their great importance in the creation of the world's wealth. If any are disposed to dispute this view, I would ask that they look about them and observe the plain manner of living, the lack of luxury and display, and the small evidences of wealth exhibited by nearly all engineers, even including those who have the best positions and the most lucrative practice.

These disadvantages which we labor under I regard as being due to the fact that the engineers are very modest in their requirements, and furthermore that they have never heeded the principle that in union there is strength. If they want things they must demand them and take means to enforce their demands. They should act together for their own common good. The engineering society should not be for the sole purpose of exchanging experiences, but rather to strengthen the position of its members and to uphold their dignity and to influence public opinion for their benefit. On all public questions affecting the interests of engineers the society should act as a unit and make itself heard and felt. The requirements for full entrance should be severe and high, and the society should establish for its members their minimum fees, and regulate so far as practicable their relations to each other and to their clients. It should throw over them a mantle of protection and discourage the process by which the client is enabled to crowd down the fees by inducing engineers to bid against each other on the same work.

By the enforcement of some such improvements as are above set forth in the relations of the engineer to his client both parties would be benefited and also the whole community would reap the advantage of better work and in many cases a more economical use of money.

Color for Signal Posts and Signals.

In a recent issue *Glaser's Annalen* discusses the question as to which is the most serviceable color or color combination for signal posts where the colors have no special significance, the color used for them being chosen with sole reference to making the signals clearly visible over reasonably long distances.

The German railroad signal regulations contain nothing bearing upon the colors to be used, and their selection is thus left entirely to the division superintendents. To this fact *Glaser's Annalen* ascribes the remarkable diversity of colors and their arrangement on such signals often encountered on different sections of one line. At one place, for example, the signal will be found painted red; at another, half the signal is red and the other half white, the two differently painted parts being arranged either longitudinally or transversely; other signals again are painted entirely white, and still others have narrow red and white stripes, the intention, of course, in every case being to make the signal visible over the greatest possible distance. The thought, however, will at once present itself that for substantially similar sets of conditions, as they are found in such cases, something like uniformity in colors and combination of colors might be maintained without impairing the efficiency of the service, and that, in fact, a near approach to a standard system might well be commended. It ought not be a difficult matter, says our contemporary, to formulate certain fundamental regulations regarding the coloring of signals which would prove generally satisfactory and could be adhered to with few exceptions. Where trouble is experienced in distinguishing signals it is generally found that with the exercise of a little thought there would have been no cause for complaint. As an example, the case is cited of a certain signal on a German line which had given rise to much annoyance, complaint being made that owing to a dark back-ground formed by the dense foliage of a tree, the signal could not be well seen. The complaint was well founded, and the signal which hitherto had been painted red was given a coat of white paint. For a time nothing more was heard of the signal; but then again the old complaints came in. The white paint, from exposure, had become gray and less distinct, and, further, during the winter's snow storms the white back ground which was formed made the signal almost wholly invisible. It was, therefore, again painted red, and when, during the following summer, complaint was once more made that it could not be easily distinguished, the trouble was found to be due simply to the fact that the paint had become too dark with age, and a fresh coat made everything satisfactory. In fact, it was then found that the red signal was much more distinct than the white one had been during the preceding summer.

To the normally-constituted eye, our contemporary goes on, red is the most easily discernible color. Taking now the case of an ordinary signal arm, it need scarcely be emphasized that the surface which it exposes is not very great. If this surface be painted half red and half white, the colors being arranged longitudinally, we simply reduce the available, visible surface by one-half, particularly on cloudy days or during snow storms, when the white half will be quite invisible. The im-

pression that by using two different colors satisfactory provision is made for differently-colored backgrounds, has been shown, by experience, to be wholly erroneous. Narrow red and white stripes on the signal arms also have only a theoretical value, and a coat of solid red, renewed at reasonable intervals, is the only color that should be used. There are exceptional cases, of course, where some other color may be advisable; for example, where the background for the signal is formed by a red brick building. In such a case a black signal arm, or one painted half red and half white, with the colors running transversely, the white half being nearest the signal mast, would be in order. The mast itself may be painted in a variety of colors, black, white and red for example, in alternating rings or horizontal stripes about 3 or 4 ft. wide. Such an arrangement would aid materially in finding the position of the signal arm.

This standard of painting our contemporary recommends for general adoption, claiming that it has successfully withstood the test of experience for many years on many miles of road.

TECHNICAL.

Manufacturing and Business.

The Pittsburgh Locomotive & Car Works, of Allegheny, has just received from the Powell Planer Co., of Worcester, Mass., four large locomotive rod planers.

George D. Wadley, Frank S. Jette, Frank H. McGee, John F. Babbit, Jr., and others have incorporated the Wadley Continuous Draw Bar Co., of Macon, Ga., to manufacture the Wadley continuous drawbar invented by G. D. Wadley, General Superintendent of the Central of Georgia.

James A. King succeeds his father, the late Zenas King, as President of the King Bridge Company, of Cleveland, O., and H. W. King has been elected Vice-President of the company, with H. B. Gibbs, Secretary.

The Mt. Vernon Bridge Co., of Mt. Vernon, O., has increased its capital stock from $100,000 to $125,000.

The following companies have filed articles of incorporation in Illinois. The Miller Railway Incandescent Signal Co., Chicago; capital stock, $250,000; incorporators, Alexander C. Miller, Thomas A. Banning and Samuel E. Hibben. The American Car & Railway Construction Co., Chicago; capital stock $1,200,000; incorporators, Watson Tranter, William A. Conover and J. G. Wolfe. The Central Construction Co., Chicago; capital stock $50,000; incorporators, Edwin F. Getchell, Charles H. Morse and Leslie Carter. Hinson Car Coupler & Mfg. Co., Chicago; capital stock, $2,650,000; incorporators, Joseph E. Forsyth, Erskine R. Merrill and James P. Ennis.

The Vulcan Iron Works Co., of Toledo, Ohio, will entertain plans and specifications for machine shop, blacksmith shop and foundry. Information will be given on request to Alexander Backus, President of the Vulcan Iron Works Co.

The Leetonia Forging Co., of Leetonia, Ohio, is enlarging its plant for making all sorts of railroad forgings, and will be one of the most thoroughly equipped plants in the country in this line.

The Carlisle (Pa.) Manufacturing Co. has under consideration the question of adding the manufacture of electric street cars to the other branches of its business, including railroad-car building. New buildings and new machinery will be necessary.

The Denver & Rio Grande recently let a contract to Croswy & Mullen, of Alamosa, Colo., for 100,000 standard gauge ties, to be delivered at the rate of 20,000 ties a month.

The Ellwood Steel Forge Company, recently chartered, is a reorganization of the Akron Forge Works, of Akron, O. The new company will erect buildings at Ellwood, Ind., immediately, having secured a cash bonus of $10,000 and 10 acres of land to remove its plant from Akron, O., to that town.

The Schultz Bridge Company, of McKees Rocks, Pa., is erecting an iron building 90 × 90 ft. for the Leachburg Foundry & Machine Company at Pittsburgh, to be completed by June 1. This will be one of the largest roll turning shops in the Pittsburgh district and will be fully equipped with new roll lathes of modern design. The firm is now building machinery for the Minneapolis Rolling Mill Company.

Iron and Steel.

The steel mills at Pueblo, Col., are about to start upon a contract with the Denver & Rio Grande for 5,000 tons of rails to be used this season in replacing old rails on the standard gauge line. The company has heretofore used 65-lb. rail, but the present order is for 75-lb. rails.

New Stations and Shops.

The Quebec, Montmorency & Charlevoix has acquired the property on the corner of St. Paul and Ramsay streets, Quebec, on which to erect a station and offices. Work on the new structures will be commenced immediately.

The plans for the shops of the new Union Car Company at Depew, near Buffalo, are practically completed and last week a contract for the office building was let to Grattan & Jennings, of Buffalo, and the contracts for the other buildings of the proposed plant will probably be given out in a few days. Nearly all the buildings will be ready for operation by Oct. 1.

James H. Taylor, formerly Master Mechanic of the Kingston & Pembroke road in Canada, is now a resident of North Galveston, Tex., and is organizing a company to build car shops at that town.

Electric Car Lighting in Texas.

The Southern Pacific has given permission to Boyd Anderson, of San Antonio, to test his patent storage battery on a passenger car running between San Antonio and Sanderson.

The machine and boiler shops of the Chicago Great Western, at South Park, Minn., which were burned recently, have been rebuilt.

Certain Standards in Passenger Service.

The following circular was issued last February to lines connecting with the New York Central & Hudson River and the Rome, Watertown & Ogdensburg:

These companies having placed the Master Car Builders' vertical plane coupler, the Sewall steam heat coupler, the Westinghouse air whistle train signal, the quick acting air brake on all of their passenger equipment, notice is hereby given to all connecting lines that on and after this date cars not so equipped will not be placed upon any of their passenger trains.

The Panama Canal.

The Colombian government has consented to prolong for 18 months the concession to the Panama Canal Company to give an opportunity for the formation of the new company. We have seen no definite statement of the terms nor any conjecture as to whether or not it is possible for the company to comply with them.

Electric Lights for Signals.

Incandescent electric lights will be used in the signal lamps in the extensive system of electro-pneumatic interlocking now being introduced at Stewart avenue, Chicago. A small dynamo is necessary for charging the storage batteries to be used in connection with the interlocking system, and this is enlarged sufficiently to supply power for electric lights to be placed on the signals. Eighty-five lights are required for the signals, 12 for the signal tower and 20 for the power house, making 117 lights in all. There are two Westinghouse 125-volt dynamos with a capacity of 150 lights each. These dynamos are both geared to the same shaft and the power for driving them is supplied by two 25 H. P. compound Westinghouse engines, so arranged that either dynamo may be driven by either engine. Steam is supplied to the plant by two 75 H. P. boilers. The usual form of oil lamp casing will be used and the electric lamps placed inside, so that in case of failure oil lamps can be substituted. The plan of the tracks and for the signaling for this installation were shown in the *Railroad Gazette*, Jan. 29, 1892. An interesting description of an installation of electric lights for signals on the Southern Pacific, at Oakland, Cal., was described in the *Railroad Gazette* of July 6, 1888.

THE SCRAP HEAP.

Notes.

The Massachusetts Senate, by a vote of 14 to 10, has rejected the bill requiring railroads whose stock is at par to limit fares to two cents a mile.

J. E. Thompson, who attempted to wreck a train on the Ohio Valley Railroad last month, has been sentenced to four years in the penitentiary.

The April report of the Statistician of the Department of Agriculture, Washington, makes the average condition of winter wheat on April 1st, 77.4 against 81.2 last year. The report was considered unfavorable enough to affect the market somewhat.

The Populists of Kansas are agitating for a special session of the legislature to renew the attack on the railroads. They claim that the present railroad law is worthless, as the commission has no power to enforce its recommendations.

Pullman palace car rates have been advanced, and the company has announced the following schedule: Sleeping cars, a day, $45; buffet, hotel and private cars, a day, $50; observation and dining cars, a day, $40. For cars engaged for 30 days and over a reduction of $5 a day will be made.

It is announced from the City of Mexico that the last spike will be driven in the Tehuantepec Railroad before the end of August. As is probably well known to our readers, Mr. E. L. Corthell is the moving spirit in the construction of this railroad and the harbor work connected with it.

The Canadian Parliament has just passed a bill amending the general railway act by the addition of a clause providing that at the crossings of railroads by an electric street line every electric street car crossing shall come to a stop and the conductor shall go forward and see that the way is clear before signaling to the motorman to "go ahead."

The chief officers of the orders of firemen, trainmen, switchmen, telegraphers and conductors recently held a secret session at Cedar Rapids, Ia., and adopted a plan of federation. It is said that the plan leaves members of each order at liberty to act for themselves and admits of federation between any or all members of the organization represented and the locomotive engineers.

An item is going the rounds of the newspapers that 115 annual passes, issued to Jay Gould in 1881, will be a part of the historical ticket exhibit at the World's Fair. One of the reporters is exercised because the Western Union Telegraph pass for that year, to be used by the man who practically owned the company, had to bear the name of "Norvin Green, President," put on with a rubber stamp.

A mulatto woman has recovered $800 in the United States Court at New York from the East Tennessee, Virginia & Georgia road for making her ride in a colored passengers car in which there were filthy passengers and other objectionable surroundinge. The road tried to show that the car was as good as that assigned to white passengers, but the evidence of this seems to have been insufficient.

A skirmish took place at Jackson Junction, 20 miles from West Union, Ia., last week, between employés of the Chicago, Milwaukee & St. Paul and a party of farmers, in which one man was fatally injured and several severely wounded. The trouble arose from the desire of the farmers to build a warehouse in opposition to the orders of the company. A force of trackmen sent to lay rails where the farmers wanted to put up their house was resisted.

The Indiana State Board of Health has issued an order to the railroads to clean up their property and place it in good sanitary condition. The order will be sent to each station agent in the state. It says that a visit of Asiatic cholera this summer is predicted, and that railroad property will be subjected to strict sanitary supervision. Freight houses must be kept free from decomposing animal, vegetable or other offensive matter. Foul cattle cars must not be allowed to stand on the tracks within the corporate limits of any city or town or near any habitation.

World's Fair Notes.

The Pennsylvania Company is building at its shops, in Fort Wayne, a dairy product car, for exhibition at the World Fair, which will cost $1,300.

A special train of 16 cars left Mount Clare last week loaded with full-size reproductions of historical locomotives for the Baltimore & Ohio exhibit at Chicago.

H K. Porter & Co. have shipped their exhibit to the World's Fair. It consists of five light locomotives of various styles. The smallest size, which is used around steel works and is termed the "Midget," will be operated at the Fair by compressed air to show its working.

The Brooks Locomotive Works shipped two engines on Saturday last for exhibition at the World's Fair. One, a large tandem compound, will be used on the Great Northern after the close of the Fair. The other, a six-wheel passenger engine, will be used in the Chicago suburban service.

The Norfolk & Western has prepared an exhibit of the undeveloped resources in coal, iron and timber along its line for exhibition at the World's Fair. The exhibit also contains numerous photographs of scenery along the line, and statistical information of the growth of the region since the road was built.

Models of the locks of the Erie Canal for exhibition at the World's Fair have been built under the supervision of the State Engineer. These are one-thirtieth the size of the originals, and one is modeled after the first lock ever used at Little Falls, and one after the most modern lock. The primitive lock model is six feet long, and the other 13 ft.

A complete model of a train of three cars and an engine, made on a scale of one-eighth the size and showing the methods of car heating made and patented by the Consolidated Car Heating Company, will be among the exhibits of the concern at the World's Fair. Eight electric lights of two candle power are placed in the top at proper distances apart. Three methods of car heating are shown. The engine is quite complete.

It is intended to put on a fast steamer, to run between Chicago and Owen Sound, Ont., on the opening of navigation on the lakes this spring. This vessel will carry passengers from Canada to the World's Fair, and has also excellent facilities for the carriage of package freight from Chicago to Canadian points and for export to European points via Montreal. The service will be weekly and the route will be via Owen Sound and the Canadian Pacific Railway.

The axle of the huge Ferris wheel was put in place last week, and now hangs 140 ft. from the ground, awaiting the part that is to be built around it. The axle is the largest steel casting ever made, and weighs 56 tons. The wheel itself will be 270 ft. in diameter, and will be one of the chief features of the Midway Plaisance. To its rim will be fitted swinging cars for passengers. With the turning of the wheel the occupants of these cars will be lifted to the height of 270 ft. from the ground, and will be afforded an unequaled view of the Fair grounds and the entire city. It will take from fifteen to twenty minutes to make one revolution. The raising of the huge axle was successfully accomplished, and a large number of spectators were present. While suspended by cables, a photograph was taken of it.

One of the interesting foreign exhibits in the Transportation hall is a German parlor car, built by Van Der Zypen & Charlier, of Cologne. This car arrived several days ago and is now being set up. It was shipped in pieces, filling 20 boxes, each piece completely finished ready to be set up without delay. The body of the car is 30 ft. long, 10 ft. wide, and is built mostly of steel. The lower half of each side is made of a single sheet of steel 30 ft. long, three feet wide, and one-eighth of an inch thick. On the side plates rest the window frames made of wood, covered with sheet iron. The truck is of pressed steel. The interior of the car is finished in solid brass in various designs, buff silk and blue velvet. The top, made of sheet steel, is oval in shape and decorated. The platform at either end is surrounded by wrought iron railings. The interior arrangement is similar to that of the day coaches found on American railroads. The seats are arranged along either side, with an aisle in the centre. After it has served its mission at the Exposition this car will be taken back to Germany and put in service on a branch of the Prussian State Railroad between Wiesbaden and Langenschwalbach.

The Bethlehem Iron Company's exhibit for the World's Fair has left the ordnance department for Chicago. This display will be the heaviest at the Columbian Exposition, weighing 1,000,000 pounds. There are four armor plates, a 17-in. plate for the Indiana, a nickel steel barbette weighing 70,000 pounds, an 11½-in. plain steel plate, a 10½-in. case of hardened nickel steel plate and a 6-in. cylindrical ventilator for the Puritan. The gun exhibit is represented by a 108,000-pound 54-in.

ingot, a finished 12-in. naval rifle weighing 101,000 pounds, a 12-in. trunnion hoop, a 13-in. tube, a 13-in. jacket and 10 gun hoops of various sizes. The shafting exhibit consists of a finished crank for the Pacific Mail Steamship company's City of Sidney, a finished crank for the United States cruiser Minneapolis, a spar shaft for the Old Colony Steamboat Company and a black, unfinished, hollow forged shaft, 66 ft. 11 in. long. This last is the most remarkable piece of forging on record and was made especially to show the skill of forgers at the Bethlehem ordnance works. The exhibit will be placed in the main building in Jackson Park and will include a full size model of the Bethlehem Iron company's 125 ton steam hammer.

Labor Matter.

All employés of the Lehigh Car Wheel & Axle Works, at Fullerton, Pa., have been notified of a reduction in wages of from 10 to 25 cents a day.

The Ann Arbor Railroad employés' Strike Committee propose to sue the railroad company, it is said, for $40,000, that sum being the estimated difference between the scale adopted after the Ann Arbor strike two years ago and the amount paid by the company.

Judge Speer, of the United States Court, has rendered a decision in the case of the petition of the Brotherhood of Locomotive Engineers to require the Receiver of the Central Railroad of Georgia to enter into a contract with that organization for the service of its members on that road. The Receiver is to carry out the contract with the Brotherhood which was in force when the Receiver was appointed.

The machinists, blacksmiths, boilermakers and other shopmen of the Atchison, Topeka & Santa Fe, having been refused an increase in wages, quit work on April 8 along the system, about 700 men going out at Topeka. The demand of the men is that the pay shall be increased 25 cents a day, and that when the company reduces expenses gangs of men be not discharged, but that the hours be reduced. About 100 men employed in the Topeka shops returned to work on Monday.

In the Senate Mr. Voorhees has offered a preamble and resolution on the subject of the recent decisions of United States judges at Toledo, O., as to the refusal of railroad employés to perform service. It instructs the Interstate Commerce Committee to inquire into the question, and to report to the Senate what action may be necessary (either by the repeal of the 10th section of the Interstate Commerce act or by the enactment of additional legislation) for the better protection of the laboring people.

London & Northwestern.

The semi-annual report of the London & Northwestern Railway for the six months ending Dec. 31, 1892, is just received. An abstract of the financial results of operation follows. The reductions have been made on a basis of £=$5.

Earnings:	
Passengers	$10,629,315
Freight	10,302,470
Minerals	6,411,145
Live stock	615,210
Parcels, horses, carriages and dogs	3,033,900
Mails	472,300
Rents, etc	544,600
Dividends	452,195
Balance brought forward	390,400
	$31,751,535
Expenses:	
Working expenses	$17,140,335
Interest on debenture stock	2,633,165
Dividends, 4 per cent per annum on guaranteed and preference stocks, and 7¼ per cent. per annum on consolidated stock	10,974,295
Chief rents, leases, etc	610,380
Balance carried forward	405,360
	$31,751,535

The passengers carried during the six months were 35,995,943, and the tons of freight 19,320,511. Passenger trains ran 11,819,617 miles, and freight trains 10,678,607 miles. The system operated 1,890 miles; the paid up capital is $527,333,795.

Trustees of the Brooklyn Bridge.

The new board of eight Bridge Trustees for the New York & Brooklyn Suspension Bridge succeeding the Board of 20, which has managed the affairs of the Bridge ever since 1875, held its first meeting this week to elect a President and Vice-President. By the terms of the bill reducing the size of the Board the present Secretary and Treasurer are to be retained in office for the term of five years, for which the appointed members of the new Board will hold office. The new Board will also fix the salaries of the appointed members, the sum not to exceed $3,000 each, save that the President will get $5,000 as in the past. Heretofore he has been the only salaried trustee. The new body of bridge trustees is composed of four ex-officio and four appointed members. The former are the Mayors and Comptrollers of New York and Brooklyn. The appointed trustees from New York are Edward V. Skinner and Clarence A. Henriques, and from Brooklyn James Howell and Seth L. Keeney.

Spanish Railroads.

A résumé of the status of the Spanish railroads, given by *El Agente Ferroviario Español*, shows that since the inauguration of the first line, in 1845, there have been opened to the public a total of 10,002 kilometres, being an average of 238 kilometres per annum. The total capital in these roads, representing stock and bonded debts, amounts to $931,426,324. The capitalization alone is $242,504,230, on which a cash capital has been paid up amounting to $197,738,976. The actual sum realized from the sale of bonds foots up $410,042,852. The number of trains moved in 1890 was 504,265, through an aggregate distance of 32,763,439 kilometres, being an average of 64.79 kilometres per train. Operating expenses for 1890 were $20,001,987, or $1,999 per kilometre. Gross receipts reached $44,513,021, thus yielding a net return of $24,452,603, equal to $2,445 per kilometre. The subventions received from the Spanish government up to the end of 1890 amounted to $152,921,123, leaving a balance due on this account of $29,138,016. The total rolling stock in 1891 was: Locomotives, 1,674, with an estimated aggregate tractive efficiency of 452,083 H. P., 4,868 passenger coaches and 32,921 freight cars.

The Liverpool Overhead Railroad.

The receipts for the first week's traffic on this line, in first and second class fares, amounted to a little over £1,000, on a ten-minute service of trains. It seems reasonable enough to suppose that the same rate of income would at least be kept up if not very materially increased, since it is proposed as soon as possible to institute a five-minute service. On the other hand, of course the undoubted novelty of the line would at the outset bring in a considerable revenue not likely to be of an altogether permanent nature. Assuming, however, that the weekly receipts do not fall below the first week's amount, there would appear to be a good future for the line. The contractors hoped and expected to reduce the consumption of fuel to 7 lbs. of coal per train-mile, and if this expectation be realized—and it is not an unreasonable one—the proportion of working expenses to receipts ought not greatly to exceed 50 per cent. If, however, the net revenue per annum be no more than £25,000, such a sum would be sufficient to pay a dividend of 5 per cent. on the total cost of the line, taken at £80,000 a mile. The first week's receipts are, however, not quite sufficient to reason upon or draw inferences from.

Sparks from Locomotives.

A woman has recently been awarded $2,500 compensation in England for loss of eyesight, due to what the jury held to have been proved as an excessive emission of sparks by a locomotive of the London & North Western Railway Co. The point proved was that the emission was excessive. The expert evidence called for the plaintiff did not even seek to prove that sparks were entirely unavoidable. It was only shown that there were more sparks than ought reasonably to have been thrown. We are not informed whether the injury to the plaintiff arose from a member of the spark family which was reasonably permissible or from one which was sinfully in excess; and this is an important point. How many sparks can a locomotive emit before it becomes indictable? At any rate the London & North Western locomotives are said to be free spark throwers, and perhaps the decision in the Davies case may lead to improvement.

The Camera in the Roadway Department.

Division Engineer Neher, of the Western New York & Pennsylvania, has an interesting collection of photographs of scenes along the line of that road. The lot numbers nearly 200 and includes landscapes, bridges, stations, forest scenes, etc. . . . The camera is coming into general use for practical purposes on railroads. A moment's exposure of a plate will often save much work in making out a report of needed repair, etc., and it is more satisfactory than any written description can be. A photographic view of a bridge or culvert, etc., will enable the superintendent to see at a glance the condition of the work and determine what it needs. The New York Central engineering corps is now using the camera more and more in its work.—*Rochester Post-Express.*

South American Railroads.

The spirit of combination of railroad interests seems to have succeeded that of competition in the Argentine Republic. Last year a fierce wordy war was fought between diverse factions over a proposed amalgamation of the Buenos Ayres & Rosario and the Central Argentine lines, which, however, came to nothing. This year it is the Buenos Ayres Great Southern and the Buenos Ayres Western roads which are proposing a coalition. The Great Southern is well known as the most progressive of all the Argentine roads, its stock being quoted at 119. The Buenos Ayres Western has been less prosperous, but is now improving, and is a well managed concern, as may appear from the fact that its working expenses amount to only 43.31 per cent. of the gross income. Its receipts for the last six months of 1892 reached $1,310,000.

The Chilian Government has passed the long pending bill providing for a guaranty of 4½ per cent. upon $5,000,000 for the Chilian section of the Trans-Andine Railway.

The Argentine railroads are continuing to make steady progress, as the weekly published statements demonstrate. For the week ending Feb. 18, 1893, the receipts from the seven principal Argentine roads aggregated $389,363, as opposed to $296,411 for the corresponding week last year, showing an improvement of 30 per cent. The mileage of these seven roads was, in 1892, 3,874 miles, which has increased within the year to 4,234, an increase of 9.3 per cent. Since Jan. 1 the increase in receipts has been 20 per cent. over those for the same period of 1892. In the meantime Argentine currency has appreciated 19 per cent.

H. W. Sibley's Gift to Cornell University.

Hiram W. Sibley, of Rochester, N. Y., has given $50,000 for the erection of a new building for the use of the Sibley College of Mechanical Engineering of Cornell University, founded by his father. The building will be completed before the opening of the University in September.

Midland Rapid Transit Railroad, Chicago.

If the number of companies incorporated to build elevated roads in Chicago, and the number of ordinances passed by the Council in favor of such roads, are good indications, Chicago will be well supplied with elevated railroads in the next two or three years. In favor of the latest project, that of the Midland Rapid Transit Company, an ordinance passed the Council and has been sent to the Mayor for his signature. This ordinance met with a decided opposition, and considerable influence is being used to get the Mayor's veto. The two professed objections to this franchise are: First, the West Side, where the proposed road is to be built, has already two elevated roads in course of construction and which are expected to be ready for use this year, and these, with their many proposed branches, north and south, will cover quite completely the western part of the city. Second, the backing and the plans of the new company are too indefinite, and by this franchise, if granted, a vast amount of real estate may be thrown into the hands of a few speculators who will do nothing with it and yet so tie it up that it cannot be sold. It is also hinted that the company owning the Madison steeet cable line is obtaining the franchise to prevent any other company from building a line to compete with the cable system, and there is probably more truth in this than there is in the report that the franchise is to be used as a means of extorting blackmail from the Lake street and Metropolitan roads. The proposed route of the Midland company follows closely the present line of the West Side cable system. An attempt was made to connect J. R. Keene, of New York, with this company, but it now appears that Alfred A. Reed and T. L. Marvel, both of New York, are interested in the project, together with some Amsterdam bankers. The names of the Chicago capitalists that are interested are not made public.

LOCOMOTIVE BUILDING.

The Chicago Great Western will soon be in the market for a number of engines, both freight and passenger.

The Lake Erie & Western has awarded a contract to the Brooks Locomotive Works for building 10 mogul locomotives.

The Shelton & Southwestern, of Washington, has just ordered a new logging locomotive from the Baldwin Locomotive Works.

The Schenectady Locomotive Works are building 80 compound consolidation locomotives for the Minneapolis, St. Paul & Sault Ste. Marie. They are of the Pitkin type.

The Kansas City, Fort Scott & Memphis has contrasted with the Pittsburg Locomotive Works for building 14 passenger engines of the eight-wheel and ten-wheel types, and two switching engines.

The Cleveland, Cincinnati, Chicago & St. Paul needs 50 locomotives in addition to the 60 ordered last fall. President Ingalls tells the stockholders in a circular, explaining the proposed issue of consolidated mortgage bonds.

CAR BUILDING.

The Middletown Car Works of Arthur King, at Middletown, Pa., has received an order for 100 cars from the Huntingdon & Broad Top road.

During the present month the Pittsburgh, Shenango & Lake Erie will receive 1,000 new 30-ton ore and coal cars, six new locomotives and six passenger cars.

The Chicago Great Western has ordered from the Haskell & Barker Car Co. 750 60,000-lb. box cars. These will be equipped with air brakes and Eureka automatic couplers.

BRIDGE BUILDING.

Albany, N. Y.—A bill to permit the New York Central & Hudson River R. R. to build a branch across the Albany basin has been reported favorably in both branches of the state legislature. The bridge will be built between Orange and Quackenbush streets, and the bill has been amended to provide for a draw span.

Allegheny, Pa.—A petition to the Board of Viewers and County Commissioners have been filed for a free bridge across the Ohio River at Locust street, Allegheny.

Chicago & Western Indiana.—The purchases made recently by this company on the west side of Custom House place, in Chicago, as noted in last week's issue, will be leased to the Louisville, New Albany & Chicago for 999 years. The tracks and warehouses of that company will be extended across Taylor street and about half a block north.

Graham, Tex.—The Commissioner's Court of Young County has decided to receive bids on a new bridge across the Brazos River and also across the Clear Fork.

Montreal.—The Grand Trunk Railroad and the corporation of Montreal are about to construct a bridge over the Mountain street crossing of the company in question. The plans as proposed show the length of the bridge to be 900 ft., costing about $80,000, half to be paid by the city and half by the Grand Trunk.

New York City.—A corporation called the Bridge Construction Company was chartered in New Jersey last week by Anthony Barrett, of Brooklyn, Edward Lauterbach, of New York City, Simon Uhlman, of Brooklyn, and others. This is the construction company which has been organized to build the bridges across the East River between Brooklyn and New York for which the East River Bridge Company has secured franchises.

The "Board for the Improvement of Park Avenue Above 106th Street" invites proposals until April 27 for the construction and erection of a four track elevated viaduct structure, to be constructed on Park avenue between 110th street and the Harlem River, in the City of New York, in accordance with specifications, copies of which can be obtained at the office of the board, Room No. 4, No. 132 Park avenue.

Perry County, Pa.—Nelson & Buchanan, of Chambersburg, have been awarded the contract to erect a steel and iron county bridge at Cunningham's Fording, Perry County, Pa., at their bid of $2,235. It is to be done by July 1.

Philadelphia.—The upper branch of the city council is discussing a project for the erection of a new bridge across the Schuylkill at Gray's Ferry, the Pennsylvania Railroad and Philadelphia Traction Co. to share the cost.

Citizens of the Twenty-second Ward propose to petition City Councils for an appropriation of $1,800 to erect a bridge over the tracks of the Philadelphia & Reading Railroad at Oak Lane.

Piedmont, Va.—Plans are being put under way for another interstate bridge between West Virginia and Maryland, from Piedmont to West Piedmont. A petition has been presented to the County Court of Mineral County, W. Va., and it has received favorable attention.

Pittsburgh, Pa.—The Pittsburgh Bridge Company and the Schultz Bridge & Iron Co. have been awarded the contract by the Allegheny County Commissioners for the erection of eight small bridges, at a cost of $7,847.

Portland, Me.—Plans have been prepared by the engineers of the Maine Central for a new structure at Sheepscott Bridge, and the company will soon commence the erection of a new iron bridge to replace the present structure.

Portland, O.—The Schultz Bridge Co., which has been awarded the contract for the new Cleveland & Pittsburgh Railroad bridge over Short Creek, at Portland Station, O., described in these columns March 17, has begun the work of preparing foundations and false work to support a temporary structure while the new bridge is being put into place.

Pueblo, Col.—The Bullen Bridge Company has been awarded the contract for building the West Fourth street bridge and viaduct in Pueblo, Col., for $43,900. There were seven bids submitted, ranging from $46,000 to $73,500.

Roanoke, Va.—The American Bridge Co., of Roanoke, has closed a contract for the erection of a railroad bridge at Charleston, S. C., to be 105 ft. in length. It also has the contract for building a bridge 108 ft. long over the Leon River, at Gateville, Tex.

Sioux City, Ia.—The incorporators of the Missouri River Bridge Co., chartered last week, are A. S. Garret-

son, James O. Pease, Sidney L. Wright, William Redwood Wright, F. C. Hills, F. A. Seaman, W. H. Goodwin, Jr., Craig L. Wright. The object of the company, as stated last week, is the purchase of the Pacific Short Line bridge across the Missouri River at Sioux City, now in course of construction, to complete the same and operate it as a railroad and wagon bridge.

City Engineer Johnson is preparing plans for the Polesson Bridge. The Board of Public Works has already advertised for bids, which will be opened April 17. The bridge is 155 ft. long and crosses a deep ravine.

Spokane County, Wash.—Bids for the construction of the Silver Lake bridge in Spokane County, Wash., were opened last week. E. A. Taylor & Co. were the lowest bidders, and the contract was awarded to them for $3,600.

Tacoma, Wash.—An ordinance to appropriate $20,000 for the erection of the Fifteenth Street Bridge has passed its third reading in the City Council.

RAILROAD LAW—NOTES OF DECISIONS.

Carriage of Goods and Injuries to Property.

In North Carolina the Supreme Court holds that a railroad which has furnished a shipper with a car which the latter has loaded with lumber is liable only as a warehouseman, until notified of the readiness of the car for transportation and of the name of the consignee; and hence it is not liable as an insurer for the destruction of the lumber by fire while the car was standing on its track before it was so notified.[1]

In Ohio, in an action against a railroad for the conversion of goods delivered to it for transportation, defendant alleged that when the goods were received a "strike," amounting to insurrection, existed at the place to which they were consigned; and that the goods, which consisted entirely of firearms and ammunition, were purchased and consigned to plaintiff, to be used in aid of the insurrection, knowledge of which having come to defendant's officers, they deemed it improper to deliver the goods to plaintiff, and, after consulting the governor of the state, and under his advice, caused them to be shipped out of the state, and detained for several months. The Supreme Court holds this a good defense.[2]

In New Jersey, it appeared that the Chicago Junction Railways and Union Stockyard Company was authorized by its charter to hold shares of stock in an Illinois corporation, a transit company which owned stockyards in Chicago, and a belt line which connected all the railroads entering the city. The transit company, most of whose stock was owned by the stockyards company, depended on the permanent market for cattle created by the presence of slaughtering and packing establishments. Some of the packers, known as "non-associate," contemplated a removal from the vicinity of the stockyards. Other of the packers, known as "associate," purchased a large tract of land at a distance from Chicago, and made preparations to remove their plants and establish stockyards of their own. The stockyards company entered into a contract with the associate packers by which it was to give them a large amount of interest-bearing income bonds in consideration of a conveyance of the land purchased, and an agreement not to remove their plants, etc. The Court of Chancery decides on a bill to restrain the execution of the contract, that trackage charges paid by the railroad companies to the transit company for the use of the latter's tracks were not repaid by the packers to the railroads, and that the agreement was not intended as a device to pay a rebate to the associate packers, in violation of the Interstate Commerce law prohibiting discrimination in railroad rates.[3]

In Indiana the Supreme Court rules that where cars loaded with railroad ties are shipped from the same station, the same number of ties being in each car, and nothing appearing by which the cost to the company could be more for shipping one car than another, a discrimination by the company, by which one shipper is charged $14 and all the others $24 per car after a certain date, before which all shipments were $14 per car, is unreasonable, and it is immaterial that the shipper in whose favor the discrimination is made ships many more cars than any of the others.[4]

In Missouri a railroad company acquired by purchase a right of way in land, 22 ft. of which was covered by a building of the grantor. Under condemnation proceedings a few years later, the company acquired more of the same tract, and a part of the land acquired under the condemnation proceedings was covered by 16 ft. of the same building. Held, that it was improper, in estimating damages to the building, to make allowance for that part of the building taken by the old right of way, and for damage to the whole building, caused by the taking of such part thereof.[5]

The Supreme Court of Alabama holds that the section of the state constitution providing that "every railroad company shall have the right with its road to cross any other railroad," construed with article 14, section 7, which provides that "corporations and individuals invested with the privilege of taking private property for public use shall make just compensation for the property taken or injured," does not authorize one railroad company to cross the track of another company without just compensation.[6]

The Federal Circuit Court rules that a railroad company may condemn more land than it has immediate need for, if it is not more than may, in good faith, be presumed necessary for future traffic, and the non-user for considerable time of land thus obtained does not indicate abandonment by the company. Also that a non-resident railroad company, which has not become domesticated under the constitution of Arkansas, cannot condemn or appropriate lands for a right of way, for depot grounds, car yards or machine shops.[7]

Injuries to Passengers, Employes and Strangers.

In Massachusetts the Supreme Court rules that a person attempting to steal a ride on a freight train is not a passenger, and the railroad company, as a common carrier, owes him no duty.[8]

In Washington it is held by the Supreme Court that the fact that the passenger injured had not paid his fare does not relieve the company from liability, where he got on for the purpose of becoming a passenger, and was willing to pay, and would have paid but for the failure of the conductor to come to him, he being obliged to stand on the platform on account of the crowded condition of the car.[9]

The Supreme Court of Oregon decides that a coupon ticket over different roads, issued by one company as principal as to its own lines and as agent as to the lines of the other roads, not limited to a continuous passage, but made subject to the stop-over regulations of the different roads, and containing no provision against its transfer, but merely purporting to be sold at a reduced rate, is a severable contract, as between the different roads, assignable at the end of any division.[10]

In New York a passenger on a street car had set a bundle on the front platform, and when about to alight from the car, after it had come to a full stop, he stooped to pick up the bundle; and as he did so the driver suddenly released the brake, and the brake handle struck him on his eye. The driver knew of the bundle, and that plaintiff was about to alight. Plaintiff was compelled to stoop to obtain the bundle, and he could not reasonably have foreseen the sudden relaxation of the brake. The Court holds the company liable.[11]

In Michigan the Supreme Court rules that after a train has stopped and a passenger proceeds to alight, it is not negligent, *per se*, for her to alight at the invitation and with the assistance of the brakeman after the train has started again, unless the speed is so great that the danger is obvious.[12]

In Arkansas the Supreme Court rules that where the fireman on a locomotive failed to maintain a lookout as the train entered upon a curve in the road, where it was impossible for the engineer to see both sides of the track from his place in the cab, and such train thereby came in contact with an animal on its track, derailing one of its cars, and injuring an express messenger, who occupied the relation of a passenger, such company is liable.[13]

In Michigan, in an action against a railroad for the death of a brakeman who had been in its employ for years, it appeared that he was a man of good habits, and experienced in the business, and fully aware of the dangers attending it; that he got off the train at a station, though unnecessary in the discharge of any duty; that he did not attempt to get on the train before it was in motion; that he walked along the train as it was moving, and passed several cars with side ladders on without attempting to get aboard; that he went to the rear end of a car not belonging to defendant and attempted to board the train; that in attempting to get on top of the car the handhold pulled out of the wood, which had become rotten, and he fell under the train; that he was familiar with a rule of the company forbidding jumping on or entering between cars in motion. The Supreme Court holds the brakeman guilty of contributory negligence and the railroad not liable.[14]

In Missouri the Supreme Court (several judges dissenting) rules that a brakeman of one freight train is the fellow servant of the fireman of another freight train employed on the same railroad.[15]

In the Federal Court it is held that a brakeman who is sent by the conductor from the rear portion of a parted train to signal the forward portion, of which the engineer is, by the rules of the company, the conductor, is a fellow servant of the engineer and cannot recover from the company for an injury caused by the engineer's negligence.[16]

In New York it is ruled that a brakeman on a freight train does not assume the risk of neglect by the company to secure safe break steps on its cars.[17]

In Alabama the Supreme Court holds that a railroad is not liable for injuries to one of its brakemen in coupling cars of another company having different styles of couplers from those in use on its own cars, because of failure to warn the brakeman of the increased hazard, such risk being apparent, and one incident to the risks assumed.[18]

In New York a car inspector, while performing his duty, stepped between two cars standing on a track on which other cars were placed by other employés of defendant. A competent brakeman was present, who neglected his duty to be on the cars switched, and they collided with a car being inspected causing the death of the inspector. The Court of Appeals rules that the failure of the brakeman to be on the cars was the negligence of a co servant.[19]

In Missouri it appeared that the conductor of defendant's freight train ordered the rear brakeman to set out four front cars; that the latter set no brakes on the rear cars, as it was his duty to do, and when the front cars and engine were uncoupled the rear cars ran backward down a grade, and collided with another train, on which deceased was fireman. The Supreme Court holds that the conductor of the first train was not guilty of negligence in failing to see that the rear cars were secured.[20]

The Federal Court rules that an engineer running back at night in search of cars broken from his train owes no duty to keep a sharp lookout with respect to a brakeman, who, being sent forward to signal him, has gone to sleep upon the track; and the company is only chargeable with negligence constituting proximate cause in case of want of care by the engineer after discovering the brakeman.[21]

The Supreme Court of Illinois holds that the duty of a master to disclose to his servant the dangerous character of the machinery to be used by him is not discharged by notifying a fellow servant, who does not communicate the notice to the servant who is injured.[22]

In Massachusetts the plaintiff was injured at a railroad crossing, where the tracks of three different companies cross the street at grade. The gateman stationed there was employed by one of the roads, and, though there was no express contract between the companies as to the gateman it was admitted that at the time of the accident, and for years before, it had been the custom of the other companies to pay to the employing company three-eighths and two-eighths respectively of the gateman's wages. The Supreme Court holds that the jury could find that there was a contract between the railroads that the employing company should furnish a gateman to raise and lower the gates for each of the railroads, and that the gateman actually employed was employed for this purpose, and that the employing company was liable for his torts.[23]

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[1] Basnight v. Atlantic & N. C. R. Co., 16 S. E. Rep., 323.
[2] B. & O. R. Co. v. Donnell, 32 N. E. Rep., 476.
[3] Willoughby v. Chicago Junction Railways & Union Stock, yards Co., 25 Atl. Rep. 277.
[4] L. E. & St. L. v. Wilson, 32 N. E. Rep., 311.
[5] Mo. Pac. Ry. Co. v. Porter, 20 S. W. Rep., 568.
[6] M. & C. R. Co. v. B., S. & T. R. Ry. Co. (Ala.), 11 So. Rep. 642.
[7] St. L. & S. F. R. Co. v. Foltz, 52 Fed. Rep., 627.
[8] Planz v. B. & A. R. Co., 32 N. E. Rep., 356.
[9] Coggswell v. W. S. & N. E. R. Co., 31 Pac. Rep., 411.
[10] Nichols v. S. Pac. Co., 31 Pac. Rep., 296.
[11] Shuler vs. T. A. R. Co., 20 N. Y. (Supp.), 683.
[12] McCaslin vs. L. S. & M. S. Ry. Co., 53 N. W. Rep., 724.
[13] Fordyce v. Jackson, 20 S. W. Rep., 528.
[14] Wilson v. Mich. Cent. R.Co., 53 N. W. Rep., 797.
[15] Relyea v. K. C., Ft. S. & G. R. Co., 20 S. W. Rep., 480.
[16] N. N. & M. V. Co. v. Howe, 52 Fed. Rep., 362.
[17] Van Tassel v N. Y., L. E. & W. R. Co., 20 N. Y. S., 708.
[18] L. & N. R. Co. v. Boland, 11 South. Rep., 667.
[19] Potter v. N. Y. C. & H. R., 32 N. E. Rep., 603.
[20] Relyea v. K. C., Ft. S. & G. R. Co., 20 S. W. Rep., 480.
[21] N. N. & M. V. Co. v. Howe, 52 Fed. Rep., 362.
[22] Pullman's P. C. Co. v. Laack, 32 N. E. Rep., 285.
[23] Brow v. B. & A. R. Co., 22 N. E. Rep., 362.

MEETINGS AND ANNOUNCEMENTS.

Dividends:

Dividends on the capital stocks of railroad companies have been declared as follows:

Boston & Maine, semi-annual, 4 per cent. on the common stock, payable May 15.
Central of New Jersey, 1¾ per cent., payable May 1.
Delaware, Lackawanna & Western, quarterly, 1¾ per cent., payable April 20.
Denver & Rio Grande, quarterly, 1 per cent. on the preferred stock, payable May 15.
European & North American, semi-annual, 2½ per cent., payable April 15.
Keokuk & Des Moines, quarterly, $2.40, payable May 1.
Long Island, quarterly 1¼ per cent., payable May 1.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Akron & Chicago Junction, annual, Cleveland, O., April 19.
Atlantic Avenue Elevated, annual, Brooklyn, N. Y., April 18.
Canadian Pacific, special, Montreal, Que., May 10.
Central of New Jersey, annual, Jersey City, N. J., May 5.
Chicago Burlington & Quincy, annual, Chicago, May 17.
Cincinnati, Jackson & Mackinaw, annual, Toledo, O., May 1.
Cleveland, Chicago & St. Louis, special, Cincinnati, O., May 10.
Cleveland, Wooster & Muskingum, annual, Cleveland, O., April 19.
Delaware & Hudson Canal, annual, New York City, May 9.
Lake Shore & Michigan Southern, annual, Cleveland, O., May 3.
Mexican Central, annual, Boston, Mass., May 3.
Michigan Central, annual, Detroit, Mich., May 4.
Missouri, Kansas & Texas, annual, Parsons, Kan., May 17.
Mohawk & Malone, special, Albany, N. Y., April 19, to approve of the lease to the New York Central & Hudson River.
New York Central & Hudson River, annual, Albany, N. Y., April 19.
New York, Chicago & St. Louis, annual, Cleveland, May 3.
New York, Susquehanna & Western, special, Jersey City, N. J., April 25.
Northern Pacific, special, New York City, April 20.
St. Louis, Alton & Terre Haute, annual, St. Louis, Mo., June 5.
Staten Island Rapid Transit, annual, New York City, April 25.
Union Pacific, annual, Boston, Mass., April 26.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *National Convention of Railroad Commissioners* will be held at Washington, D. C., on April 19.

The *Association of American Railway Accounting Officers* will hold its fifth annual meeting at the Auditorium Hotel, Chicago, commencing May 31.

The *Railway Agents' Association of North America* will meet at Old Point Comfort, Va., on Tuesday, May 16.

The *Western Railway Club* meets at the rooms of the Central Traffic Association in the Rookery Building, Chicago, on the third Tuesday in each month, at 2 p. m.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 7.30 p. m.

The *Northwest Railroad Club* meets at the Ryan Hotel St. Paul, on the second Tuesday of each month, except during June, July and August, at 8 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month.

The *Boston Society of Civil Engineers* meets at Wesleyan Hall, Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

The *Western Society of Engineers* meets at 78 La Salle street, Chicago, on the first Wednesday in each month, at 8 p. m.

The *Engineers' Club of St. Louis* meets in the Odd Fellows' Building, corner Ninth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Engineers' Society of Western Pennsylvania* meets at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month at 8 p.m.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December, when they are held on the second Tuesday only.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday except during the months of June, July, August and September.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Tacoma Society of Civil Engineers and Architects* meets in its rooms, 201 Washington Building, Tacoma, Wash., on the third Friday in each month.

The *Association of Engineers of Virginia* holds informal meetings the third Wednesday of each month, from September to May inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

American Society of Civil Engineers.

At the meeting of the American Society of Civil Engineers on Wednesday evening, April 5, Mr. Walter McCulloh, Jun. Am. Soc. C. E., presented a paper on the Construction of a Water-Tight Masonry Dam, illustrated by a number of stereopticon views. An abstract of this paper is given in the *Railroad Gazette*, April 7.

In answer to questions from various members in discussion, Mr. McCulloh stated that the cement used in construction was entirely an American natural cement, that really no "Rosendale" was used. This cement was delivered in bags, and about ten per cent. of all the bags in each shipment were sampled for tests, 10 samples making the average, there being in some of the averages as high as one hundred breakages. In laying masonry in freezing weather hot brine, made in the proportion of five pounds of salt to a barrel of water, was used in mixing the mortar, the stones were steamed, and very good results were obtained, but a limit as to temperature followed; if the thermometer fell to 20 or 22, work was stopped for that day. In this connection some interesting laboratory tests were made. Some briquettes were made of mortar mixed with brine; these were put out immediately, when the weather was down to 16, in one case six, above zero, and they disintegrated immediately; this mass then froze solid in less than an hour. The briquettes were left for 48 hours, then taken into the laboratory, put into the cellar and left for 24 hours more; when this mass was taken out it was thoroughly set. Some of these tests were made without salt and the difference was found to be very slightly in favor of the salt, the difference between those made with salt and those made without salt was scarcely more than might be frequently found in the same batch of any 10 briquettes.

The Secretary announced that Mr. William E. Worthen, Past President of the Society, had been elected an honorary member of the Society.

The deaths of Mr. J. W. Putnam, Associate, and of Mr. William W. Thayer, Associate Member, were announced.

The following persons were elected: As Members, William De La Barre, Minneapolis, Minn.; Edward Bernard Ives, New York City; George Albert Wetherbee, Malden, Mass; Preston King Yates, New York City. As Associate Members: Bernt Berger, New York City; Richard Sutton Buck, Vicksburg, Miss.; Abraham Lincoln Hyde, Cleveland, O.; Charles Harry Moore, Hempstead, N. Y.; Charles William Smith, New York City; Henry Maynadier Steele, New York City; Walter Watson, Pittsfield, Mass. As Associate: Charles Marshall Saeger, Allentown, Pa. As Juniors: Alfred Carroll Bell, Milwaukee, Wis.: Nimrod Washington Long Brown, Cleveland, O.; Andrew Ernest Foye, New York City; David Cullen Griggs, East Berlin, Conn.; Thomas McKenzie, Chautauqua, N. Y.; David Anderson Miles, Kansas City, Mo.; Charles Henry Nichols, New Haven, Conn.; Winfield Scott Potter, Brooklyn, N. Y.; Walter Tuttle Spencer, Guildford, Conn.

Boston Society of Civil Engineers.

At the regular meeting of the Boston Society of Civil Engineers, on April 19, Mr. George S. Morison, of Chicago, will address the Society, devoting himself principally to bridges across Western rivers.

Central Railway Club.

The regular meeting of this club was held March 22, President A. M. Waitt in the chair.

The Secretary was directed to report an amendment to the by-laws, changing the November and May meetings to October and April. This will be acted on at the next meeting.

A special committee on a definite defect card made a report submitting designs of cards. The recommendations of the committee appear on another page. A special committee submitted a report on the means of getting more efficient combustion on locomotives, which was discussed. This report also is published elsewhere.

The President announced the following committee on revision of the Rules of Interchange to report next month: Samuel Higgins, Chairman. J. R. Petrie, John Turner, R. S. Miller and F. H. Soule.

Civil Engineers' Society of St. Paul.

The regular monthly meeting was held on April 3, President Wilson in the chair, and 11 members and 23 visitors present. Mr. J. D. Estabrook read a paper on the Isthmus Canals and their Relation to a Deep Waterway Between the Great Lakes and the Atlantic Seaboard of New York. Mr. Estabrook's paper gave a history and description fully illustrated by maps of the Suez, Panama, Nicaragua and Erie canals. Mr. Estabrook was requested to prepare his paper for publication in the *Journal Association of Engineering Societies.*

Convention of the Master Mechanics' Association.

The Secretary has issued the following circular: As there appears to be considerable uncertainty among members as to where Lakewood, N. Y., the place selected for the next convention, is located, the following particulars may be found useful. Lakewood is situated on the southeast shore of Lake Chautauqua, and has a station on the main line of the New York, Lake Erie & Western Railroad, five miles west of Jamestown, N. Y., and 74 miles west of Buffalo. Travelers can leave Lakewood in the morning and get to Chicago the same night. There are electric cars running between Jamestown and Lakewood at short intervals. Jamestown can be reached by a direct connection with the Lake Shore & Michigan Southern, or by the New York, Chicago & St. Louis, at Brocton Junction, nine miles west of Dunkirk. Passengers over the Lake Shore road ought to change cars at that place. The Western New York & Pennsylvania Railroad has a branch connection with Jamestown.

The convention begins on Monday, June 19. Persons wishing to secure rooms ought to apply without delay to John C. Brady, Kent House, Lakewood on Chautauqua Lake, N. Y.

Engineers' Club of St. Louis.

The club met at 8 p. m., April 5, 1893, at the club rooms, President Moore in the chair, and 18 members and one visitor present. The executive committee reported the doings of their 143d meeting. It was announced that Mr. Edward Flad had been elected Director. A letter was read from Mr. Schmidt, Secretary of the General Committee, Associated Engineering Societies, asking that lists of the important civil, mechanical, mining, metallurgical electrical, military, marine and naval engineering works and industries in St. Louis and vicinity be made out in order to aid visitors to the Columbian Exposition in making visits to see the work, which they might be interested in. Professor Johnson moved that a committee of five, with the President as Chairman, be appointed to act as an entertainment committee. The motion was carried, and the President appointed Messrs. Potter, Johnson, Ockerson and Ayer.

Prof. J. H. Kinealy then read the paper of the evening on "Standardizing Indicators." The paper gave details of indicators and their errors and the methods of correcting these errors. Discussion followed by Messrs. Johnson, Herman, Bryan, Russell, Moore, Baier, Ferguson and Crow.

Engineer's Society of Western Pennsylvania.

A regular meeting was held March 21, President M. M. J. Becker in the chair; 52 members were present. Twelve applicants were elected to membership.

The paper for the evening was read by Mr. Thos. H. Johnson, entitled "A Note on Pin Plates." The author described some tests of full size top chord members and their modes of failure. The test pieces were duplicates of members for actual use. They were made by four prominent bridge companies, and were in accord with the prevailing practice in the matter of pin plates, and the number of rivets in each. Yet out of nine tests, seven failed at the ends, and not as columns. Of these seven, five failed by shearing the top flange rivets and buckling the webs in front of the pin plates; one failed by tearing the webs and plates horizontally through the pin holes, as if by vertical strains in the web, and one failed by shearing the top flange rivets on one side and by tearing the web on the other side, thus presenting both classes of failure in the same piece.

The paper then shows that the first mode of failure results from insufficient number of rivets to transmit to the top flange its full share of the load. The second mode from vertical tension due to the vertical components of the oblique lines of transmission from pin to flange rivets.

To correct these evils the following rules are presented:

First—The pin plates should in all cases engage enough flange rivets to transmit to the top axles and cover plate their full proportion of the load.

Second—All pin plates should have their fibres vertical and at right angles to those of the web, to better resist the vertical tension.

Third—The length of pin plates should be such that the distance from point of pin to farthest flange rivet shall not be less than four times the vertical distance from pin centre to top pitch line.

This last rule is provisional only, and is based on the condition that the *mean* angle of transmission (from pin to middle rivet) shall not exceed 30 deg. from the axis, being the same angle now found in the best practice for transmitting tension strains in cyclar heads.

When the outside pin plate engages flange rivets those rivets are in double shear, the leg of the angle being held between the pin plates on the outside and the web plate on the inside, and in such cases the third rule will usually govern. For flange rivets in single shear the first rule will require pin plates of greater length than are required by rule three.

General Committee of Engineering Societies.

Mr. E. L. Corthell, Chairman, announces that the reception rooms and office of the General and Executive committees of the Associated Engineering Societies of the United States and Canada and of the General Committee of the World's Congress Auxiliary on the International Engineering Congress, on and after May 1, 1893, and until the close of the World's Columbian Exposition, will be at No. 18 Van Buren street, Chicago. All communications after May 1 should be addressed to or to the care of Mr. Max E. Schmidt, Secretary. Visiting engineers may have their mail thus addressed. The committee rooms of the Associated Societies at the Exposition will be situated in the southwest corner of the gallery of the Mines and Mining Building, where the Secretary or some of the staff will be present during the Exposition to meet visiting engineers.

Master Mechanics' Association.

The committee on the use of malleable castings in place of expensive forgings in locomotive construction has issued a circular of inquiry, requesting information on the following heads:

(1.) Detail parts of locomotives or tenders, known to be now made of malleable iron. (2.) Detail parts of locomotives or tenders now being usually made as forgings, but which could possibly be made more cheaply (and still of sufficient strength) in malleable iron. Replies should be sent to R. H. Soule, Superintendent Motive Power N. & W. R. R., Roanoke, Va.

Toronto Engineering Society.

The annual meeting of the Engineering Society of the School of Practical Science was held in Toronto last week. The Vice-President, A. J. McPherson, was in the chair, and there was a large attendance. The elections for officers of 1893-4 resulted as follows: James D. Shields, President; Harold Rolph, Vice-President; A. Tennyson Lye, Treasurer; J. W. Armstrong, Recording Secretary; W. A. Bucke, Corresponding Secretary; H. H. Moore, Librarian.

The Traveling Engineers' Association.

Secretary W. O. Thompson, of Elkhart, Ind., announces that there will be a meeting of the Executive Committee of the Traveling Engineers' Association at the Grand Pacific Hotel, at Chicago, in Club Room A, Wednesday, April 26, at 10 o'clock, a. m. The committee extends a hearty invitation to all members and friends of the association to be present on this occasion and take part in the matters that will come up for consideration.

University of New York.

A. Fteley, Chief Engineer of the Croton Aqueduct, lectured on April 11 to the students of the Engineering School of the University of the City of New York. An interesting description was given of some of the difficulties encountered during the construction of the aqueduct.

Western Railway Club.

The next regular meeting of the club will be held in Room 850, The Rookery, Chicago, at 2 o'clock p. m., April 18, at which time the revision of the Rules of Interchange will be discussed.

It is proposed to have the proceedings of this meeting embody a report of coupler tests. The pulling tests will be conducted at the World's Fair grounds, beginning Monday, April 17, at 7:30 a. m. The drop tests will be conducted at the works of the Sargent Co., Thirty-ninth and Wallace streets, Chicago, beginning Wednesday, the 19th, at 7:30 a. m.

Members desiring to witness the tests at the World's Fair grounds may procure tickets of admission by applying to the Secretary, at 818 The Rookery, Chicago.

PERSONAL.

—Mr. G. R. W. Armes, Assistant Treasurer of the Norfolk & Western Railroad and the Roanoke Machine Works, resigned this week.

—Mr. David Preston, Mechanical Engineer of the Canadian Pacific, is seriously ill at his home in Montreal, suffering from blood poisoning.

— Mr. Edward Mahler, who has been connected with the purchasing department of the Philadelphia & Reading road, has been appointed Purchasing Agent of the New York & New England road, to succeed Mr. Charles Parsons, 3d.

—Mr. D. M. Philbin, Superintendent of the Duluth, South Shore & Atlantic, has resigned to become General Manager of the Duluth, Missabe & Northern. He will be succeeded as Superintendent of the former road by C. E. Lyttle.

—Mr. J. R. Kendrick, General Manager of the Old Colony road, has been appointed Third Vice-President of the New York, New Haven & Hartford. He will continue to have his headquarters at Boston and will be in charge of the Old Colony lines.

—Mr. W. C. De Armond has resigned as Purchasing Agent of the Norfolk & Western Railroad and the Roanoke Machine Works, and for the present the supply department of those two companies will be in charge of Mr. E. T. Burnett, Assistant Purchasing Agent, Philadelphia.

—Col. O. E. McClellan, who has been Superintendent of the Middle Division of the Pennsylvania road, with headquarters at Harrisburg since July 1, 1883, has tendered his resignation, to take effect May 1. He will remove to Philadelphia and it is understood will leave the railroad service.

— Mr. W. S. Morris, who has been Superintendent of Motive Power and Rolling Stock of the Chicago & West Michigan, and the Detroit, Lansing & Northern, is Mr. William Garstang's successor as Superintendent of Motive Power on the Chesapeake & Ohio Railroad. Mr. Garstang now holds a similar position on the Cleveland, Cincinnati, Chicago & St. Louis.

—Mr. Chauncey Ives has resigned his office as Chief Engineer of the Cumberland Valley road, to give his entire attention to the surveys for the eastern extension of the West Virginia Central & Pittsburgh road, which is to be built under the name of the Baltimore & Cumberland. Mr. Ives' office during the progress of the surveys will be at Hancock, Md. His successor on the Cumberland Valley road is Mr. Thomas J. Brereton, who has been in the Engineering Department of the Pennsylvania Railroad for 11 years.

—Dr. Addison Hills, Assistant to the President of the Lake Shore & Michigan Southern Railroad, celebrated his 86th anniversary on April 7, and received the congratulations of all the officers of the company. He is still hale and hearty and well able to attend to his regular duties. Dr. Hills has been in railroad service for 56 years, his first office being as auditor on an Ohio railroad. Later he was with the Erie road for some years, and then with the "Big Four" line. In 1868 he began his long connection with the Lake Shore, being appointed in that year General Freight Agent. He continued in that office after the consolidation and until 1881, when he became Assistant General Manager. This office he held until his appointment to the position he now holds, in 1886.

— Sir George Findlay, General Manager of the London & Northwestern Railway, died at his home Sunday morning, March 26. Some of our readers knew Sir George Findlay personally; others knew him through the admirable book which he wrote and which was published in 1889, entitled "The Working and Management of an English Railway," and very many more knew him as the General Manager of the greatest railroad system of England. It seems that he had been in delicate health for a number of years, and that the Directors had asked him to assume the Chairmanship of the railroad when Sir Richard Moon retired, but he preferred to stay a while longer in the place that he so successfully filled as General Manager. He was born in 1829, of Scotch parentage, and has been nearly 50 years in railroad service. He began his railroad life in 1845 under the celebrated contractor, Sir Thomas Brassey, who was then engaged in building the Trent Valley Railroad from Rugby to Stafford. A year later this railroad became a part of the London & Northwestern. Findlay, however, was not transferred to the London & Northwestern at that time, and indeed did not enter the service of this company until 1862. On that road he became Chief Goods Manager, and in 1874 he was made Traffic Manager. The functions of this office were essentially the same as those of the present office of General Manager, and the latter title was given to the office later.

Sir George Findlay was a very busy and extremely active man. He was the General Manager of one of the greatest railroad systems of the world, and had also a wide interest in railroad matters outside of his own system and his own country. He was a member of the International Railroad Commission and contributed papers to its congresses. He delivered occasional lectures before the students of military engineering at the Chatham School, was Lieutenant Colonel of the Railway Volunteer Staff Corps, and by lectures and writing endeavored to guide public opinion on railroad matters in many ways. He was knighted last year in recognition of his services to his country.

—Mr. Joseph S. Harris, who was elected President of the Philadelphia & Reading on April 8, is the present President of the Lehigh Coal & Navigation Co., which owns the Lehigh & Susquehanna Railroad and over 100 miles of canal. Mr. Harris comes of a family whose fame is associated with the development in the Schuylkill territory of the coalfields. He was educated as a civil engineer, and for a number of years was employed upon the United States Coast Survey before he took up railroad engineering. For a time during its earlier history Mr. Harris was connected with the North Pennsylvania Railroad, and became identified with the Lehigh Valley as engineer of the Lehigh and Mahanoy Division of that system. He left the Lehigh Valley road to become Chief Engineer of the Morris & Essex road, and was afterward located for some years in Pottsville, Pa. Then he became assistant to the Chief Engineer of the Philadelphia & Reading, resigning that office to be Mining Engineer and Superintendent of the Lehigh Coal & Navigation Company. Later he became General Manager of the Central of Jersey road. About this time, he prepared, at the request of President Gowen, of the Philadelphia & Reading, an ex-

haustive report on the value of the coal lands belonging to the company and lying in its territory. Mr. Harris was one of the receivers of the Central of New Jersey, during the last receivership of that company. While serving in that capacity Mr. Harris became President of the Lehigh Coal & Navigation Company in 1882. About this time he was also made a Vice-President of the Central of New Jersey, which position he resigned shortly after the coal agreements between the Philadelphia & Reading, the Central of New Jersey and the Lehigh Valley were made, to become Vice-President of the Philadelphia & Reading Coal & Iron Co. When the Reading and Jersey Central roads separated by order of the courts, Mr. Harris resigned from the Reading Coal & Iron Co. and devoted his entire time to the management of his office as President of the Lehigh Coal & Navigation Co. Mr. Harris has not yet formally accepted the Presidency of the Reading road.

ELECTIONS AND APPOINTMENTS.

Baltimore & Cumberland Valley.—A meeting of the stockholders was held at Baltimore, Md., April 10, at which Henry G. Davis resigned as President and Director, and Col. T. B. Davis, his brother, was elected President to succeed him. R. C. Kerens, of St. Louis, also resigned as Director, and C. M. Hendley, Secretary of the company, was elected to succeed him.

Chicago Great Western.—W. S. Morris, Superintendent of Motive Power and Rolling Stock, having resigned to accept a position with another company, the office will until further notice remain vacant and the duties thereof will be performed by the respective Master Mechanics. George A. O'Keefe and W. K. Christie, under the direction of the General Superintendent.

Cincinnati, Richmond & Fort Wayne.—At the annual meeting of this company, held at Richmond, Va., April 8, the following Directors were elected: C. C. Binkley, William Parry, John F. Miller, Henry C. Robinson, David Studebaker, J. T. Brooks, Thomas Messler, James McCrea, William O. Hughart, William R. Shelly and Thomas O'Brien. The officers are: President, William Parry; Vice-President, W. O. Hughart; Secretary and Treasurer, F. A. Goram.

Cumberland Valley.—Thomas J. Brereton, for about 11 years connected with the engineering department of the Pennsylvania, is the successor of Chauncey Ives as Chief Engineer of this road.

Duluth, South Shore & Atlantic.—C. E. Lyttle, formerly Chief Train Dispatcher of this road, but recently connected with the Lake Erie & Western, has been appointed Superintendent to succeed D. M. Philbin, resigned to accept a position with another company.

Elgin, Joliet & Eastern.—C. H. Ackert has been appointed General Manager of the road, with general supervision of all departments except the treasury. He was formerly General Manager of the Iowa Central.

Fonda, Johnstown & Gloversville.—B. T. McKeever has been appointed Superintendent of the road, in place of L. Caten.

Galveston, Houston & Henderson.—At the annual meeting, held at Galveston, Tex., April 3, the following officers were elected: J. L. Kane, Galveston, President; R. B. Baer, Vice President; A. A. Van Alstyne, Secretary and Treasurer, and C. C. Hedge, New York City, Assistant Secretary. The stock of this company is owned by the Missouri, Kansas & Texas, but the road is operated by the International & Great Northern.

International & Great Northern.—The annual meeting was held in Palestine, Tex., April 3, at which the following directors were elected: George J. Gould, Edwin Gould, Howard Gould, S. H. H. Clark, H. B. Kane, A. R Howard, Ira H. Evans, F. A. Rice, James A. Baker. The following officers were elected: George J. Gould, President; S. H. H. Clark, First Vice President; H. B. Kane, Second Vice President; A. R. Howard, Secretary and Treasurer; H. B. Henson, Assistant Secretary and Treasurer.

Jacksonville, St. Augustine & Indian River.—At the annual meeting recently held the following Directors were elected: Henry M. Flagler, H. H. Flagler, J. R. Parrott, A. Anderson and J. E. Ingraham. The officers elected are as follows: President, H. M. Flagler; Vice-President, J. R. Parrott; Secretary, Jasper C. Salter; Assistant Secretary, H. S. Jennison; Treasurer, Samuel W. Crichlow.

Jacksonville, Tampa & Key West.—Receiver and General Manager R. B. Cable issued circulars on April 8 announcing his resumption of the management of the property and making appointments as follows, to take effect at once: J. E. Starke, General Auditor, Jacksonville, Fla.: James Menzies, General Freight Agent, Jacksonville; G. D. Ackerly, General Passenger Agent, Jacksonville; William Rutherford, General Master Mechanic, Palatka; J. H. Bland, Purchasing Agent, Jacksonville; W. B. Coffin, Superintendent, Jacksonville; T. M. Day, Jr., Attorney, Jacksonville. These appointees supersede those of Receiver Mason Young, with one or two exceptions, and most of the officers have held their respective positions previously.

Long Island.—The following directors were elected at the annual meeting held at Long Island City, April 11: Austin Corbin, C. M Pratt, Frank L. Babbitt, W. B. Dickerman, G. S. Edgell, Daniel Lord, W. B. Kendall, J. G. K. Duer, James D. Campbell, Dumont Clarke, John P. Townsend, Everett R. Reynolds and Andrew Culver. Mr. Culver was elected to succeed Benjamin Norton.

New York, Chicago & St. Louis.—John T. McKee has been appointed General Baggage Agent, and Superintendent of Dining Car Service, with office at Cleveland, O.

New York, Lake Erie & Western.—A. W. Bodle, Division Passenger Agent at Buffalo, has been promoted to be General Northern Passenger Agent with headquarters at Detroit. Henry C. Jaeger, Division Passenger Agent at Rochester, will be transferred to Buffalo. S. J. Sharp, Canadian Passenger Agent at Toronto, has resigned.

New York & New England.—Edward Mahler has been appointed Purchasing Agent of this company, taking effect from April 1, with office at No. 180 Summer street, Boston, Mass.

Thomas Kersley, Superintendent of the Philadelphia & Reading machine shops in Philadelphia, has been appointed Master Mechanic with headquarters in Boston, to succeed E. M. Humstone, resigned.

New York, New Haven & Hartford.—The office of Third Vice-President of the company has been created, and J. R. Kendrick, formerly General Manager of the Old Colony Railroad, has been appointed to the position.

New York & Northern.—Samuel Barton, W. H. Paulding and C. F. Cox were elected Directors of the company at a meeting in New York City, April 7, in the places of O. H. Payne, W. C. Whitney and Thomas Denny, who resigned. The new directors represent the interest of the New York Central & Hudson River road.

Pennsylvania.—Hugh B. Ely was last week appointed Superintendent of the Insurance Department, the appointment dating from April 1. This is a new office, but Mr. Ely has been performing the duties of the position for some time, and the appointment makes no change in his duties.

Pennsylvania Central.—The following directors were elected at Philadelphia this week: Walter L. Ross, Samuel H. Hicks and C. O. Knight, of Philadelphia; William M. McLaughlin and C. M. Clement, of Sunbury, Pa., and J. I. Higbee, of Watsontown. Walter L. Ross has been chosen President, S. H. Hicks, Vice-President and William J. McHugh, Secretary and Treasurer.

Pittsburgh, Cincinnati, Chicago & St. Louis.—At the annual meeting held at Pittsburgh, April 11, H. H. Houston, J. T. Brooks and John E. Davidson were re-elected directors. Mr. Charles E. Pugh was elected a director to succeed the late J. N. Du Barry.

Pittsburgh, Shenango & Lake Erie.—The annual meeting of this company was held in Meadville, Pa., April 4, at which the following directors were elected: S. B. Dick, A. C. Huidekoper, John Dick and John E. Reynolds, of Meadville, Pa.; Dumont Clarke and Schuyler Quackenbush, of New York; Henry M. Debert, of Philadelphia; Thomas H. Wells, of Youngstown, O.; Allen M. Cox, Conneaut, O.

Reading, Baltimore & Lancaster.—Last week a meeting was held, at which these officers were elected: President, Sidney C. Long, of Baltimore; Vice-President, Isaac McHose, of Reading, Pa.; Secretary, H. N. Howell, of Lancaster, Pa.; Directors, E. Billingsfelt, Adamstown; John F. Ingram, Strasburg; S. Clay Miller, Lancaster; John A. Burger, Philadelphia.

Rochester & Honeoye Valley.—The following directors were elected at the annual meeting recently held: Donald McNaughton, Joseph W. Taylor, Henry D. McNaughton, George Moss; Alexander M. Holden, Wilson S. Bissell, George J. Sicard, Elisha P. Wilbur, Charles Hartshorne, Robert H. Sayre, John B. Garrett, Henry S. Drinker, J. F. Schaperkopper.

St. Louis, Vandalia & Terre Haute.—J. W. Cruft, for 13 years Treasurer of the road, has resigned on account of ill health. Robert B. Thompson will succeed Mr. Cruft.

San Antonio & Aransas Pass.—The directors of the company met at San Antonio, Tex., April 5. The resignation of J. Kennedy Tod, one of the directors, who resides in New York, was accepted, and M. D. Monserrat elected to fill the vacancy. The resignation of E. P. Swenson, of New York, as Vice-President, was accepted, and Mr. Monserrat elected to that position. The resignation of President D. B. Robinson was accepted, and Thomas E. Stillman, of the law firm of Butler, Stillman & Hubbard, elected President and Director. Mr. Monserrat, the new Vice-President, is Vice-President and General Manager of the New York & Texas road, and other Southern Pacific lines in Texas.

Silver Springs, Ocala & Gulf.—At a meeting of the Board of Directors of this company held April 6, the following officers were duly elected: H. B. Plant, President; Thomas C. Hoge, Vice-President; R. B. Smith, Secretary, and J. Moultrie Lee, Treasurer. The President, Vice-President and Secretary are located in New York, and the Treasurer at Savannah, Ga. This road is now one of the Plant System lines.

Southern Pacific.—At the annual meeting of the stockholders at San Francisco, April 5, the following directors were elected: C. P. Huntington, H. E Huntington, Leland Stanford, S. T. Gage, Charles F. Croker, George Crocker, Thomas H. Hubbard, Thomas E. Stillman, A. N. Towne, J. C. Stubbs and N. T. Smith.

Tennessee Coal, Iron & Railroad Co.—The annual meeting was held at Tracy City, Tenn., April 4. The directors elected Nathaniel Baxter, Jr., President; H. L. Debardeleben, Vice-President; T. C. Aldrich, Second Vice-President and General Manager, and James Bowron, Secretary and Treasurer.

Texas & Pacific.—The annual meeting which was adjourned from March 15, was held in Dallas, Tex., April 3, at which the following directors were elected for a term of six years: George J. Gould, Russell Sage, Samuel Sloan, John T. Terry, C. M. McGhee, Isaac J. Wistar, John N. Hutchinson, C. E. Satterlee, T. T. Eckert, Samuel Thomas, A. L. Hopkins, Milton H. Smith, Howard Gould, John G. Moore, R. M. Gallaway, S. H. H. Clark and E. B. Wheelock. Messrs. Howard Gould, John G. Moore and R. M. Gallaway were elected to fill vacancies. The officers elected were: George Gould, President; S. H. H. Clark, First Vice-President, and C. E. Satterlee, Secretary and Treasurer.

RAILROAD CONSTRUCTION.

Incorporations, Surveys, Etc.

Allegheny Connecting.—Incorporated at Harrisburg, Pa., April 7, to build a road, beginning in the city of Pittsburgh near the corner of Twenty-sixth street and Railroad street, thence to and along the south bank of the Allegheny River to a point near Thirty-third street in Pittsburgh. The distance is one mile and the capital stock is $10,000. George T. Oliver, Pittsburgh, is President; Stephen W. Tener and William Jenkins are the other directors.

Atlantic & Northwest.—Tenders will be received until April 25 for the work of clearing and grading the Northern Ontario extension of the Atlantic & Northwest, westward from Eganville, Ont. Profiles and specifications relating to 50 miles of the work can be seen in the office of C. W. Spencer, General Superintendent in Montreal, to whom all tenders will be addressed.

Baltimore & Cumberland.—The West Virginia Central & Pittsburgh still has three corps of engineers in the field on the preliminary surveys for the above road, its eastern extension from Cumberland, Md. Work has been commenced on the new line near Cumberland, but not a great deal has been done in the way of actual construction. The engineers are reported to be having little trouble with the location of the line. The extension will be from Cumberland to Hagerstown, Md., and will be a little less than 100 miles in length. At that point it will connect with the Cumberland Valley road and thus secure a short connection with the Pennsylvania at Harrisburg and the East, the greatest advantage being the light grades encountered. At present all Eastern freight has to be transferred at Cumberland to the Baltimore & Ohio or Pennsylvania road. At this point the Baltimore & Ohio is nearly always blocked and serious delays are of constant occurance. Freight transferred to the Pennsylvania has to be hauled by way of Huntingdon and over the mounains. The new extension will do away with this long detour and give the company's coal an outlet out to the East without delays or extra haulage

Baltimore & Lehigh.—William Kenefick, of Kansas City, has the sub-contract for the entire work of changing this road to standard gauge between Baltimore ang York, Pa., 80 miles. The work is to be completed in five months. At present about 800 men are employed, but this force is to be increased.

Beech Creek.—The extension of this line to Mehaffey, Pa., was opened for regular traffic on Monday of this week when the first through passenger trains to that point were run. This extension begins at Kerrmoor and extends westward to Mehaffey, and is 12 miles long. It gives the Beech Creek road a connection with the Cambria & Clearfield branch of the Pennsylvania, and the two companies have trackage rights over each other's lines.

The building of this extension was begun in August, 1891, and about 1,000 men were continuously employed. It has a grade of 52 ft. to the mile. There are two tunnels, the first, about two miles from Kerrmoor, which is 800 ft. in length; the second, 500 ft. in length, and one mile west of the other tunnel. They are 36 ft. wide, are timbered with oak and arched with stone and brick. The timber was allowed to stand.

Boston & Nova Scotia Coal and Railway Company.—This company has been organized recently by A. C. Ross, of North Sidney, N. S., and the bill to charter the company is now before the Nova Scotia Legislature. A New England syndicate is said to be interested in the company, and has purchased the Broad Cove coal mines in Inverness County, N. S., and propose to build a railroad about 34 miles long from Orangedale on the Intercolonial road to the mines, which have heretofore been undeveloped on account of the lack of shipping facilities. The names of the incorporators are: John W. Chandler and John C. Cobb, of Boston; David S. Baker, Jr., of Providence; William J. Fraser, of Halifax; A. C. Ross, of North Sidney; ex-Mayor Patrick O. Mullin, of Halifax; R. P. Fraser, of Pictou, and John McKeen, of Mabou.

Canadian Pacific.—Grading will commence on the "Soo" extension in May. Work on the bridges will, however, start at once, over 100 cars of timber from British Columbia being expected every day. There is considerable trestle work to be done near the Souris River, which will require a large staff of men to complete. As soon as possible work on the other portions will begin. The distance from Pasqua, Assin., to the International boundary line is 161 miles.

Cape Breton.—Work will commence on the Orangedale and Broad Cove, C. B., road on May 1, and the 25 miles for which the subsidy has been granted by the Dominion government will likely be completed in the fall. Work will also be resumed on the "shore road" from Hawkesbury to Mabou. Fifteen miles of this road is already graded. The company undertaking the work is composed of New Glasgow and Montreal capitalists.

Charleston, Clendennin & Sutton.—This company which has its line completed and ready for operation from Charleston to Clendennin, W. Va., has appointed a committee of stockholders to fund the indebtedness of the road and to make arrangements for securing the money needed to complete the road as surveyed. It is not probable that any effort will be made to reach Sutton in the near future, but the line is to be continued up Elk River, to reach valuable coal and timber lands now undeveloped.

Chicago & Eastern Illinois.—The contract for the new line to connect the main line with the St. Louis division at Sidell, Ill., has been let to McArthur Brothers, of Chicago. The new road will be 34½ miles long and will extend from a point on the main line 1½ miles southeast of Rossville, a station about 20 miles north of Danville, to a point on the St. Louis Division three-fourths of a mile east of Sidell. The surveys have been completed and everything is ready for the rapid construction of the road.

Chicago Lake Street Elevated.—The Chicago City Council committee has agreed to recommend for passage the ordinance authorizing the above company to build and operate branch lines as follows: Beginning on the main line between Morgan street and the river and extending northeast to Fullerton avenue at a point east of Sheffield avenue, and thence northeast to the city limits; a branch on Market street to Randolph street, and to Central avenue; a branch north of Fullerton avenue commencing at some point between Addison street and Fullerton avenue, and extending west to the city limits; a branch beginning between Desplaines and Loomis streets and running south to Eighty-seventh street; a branch between Hamlin and Crawford avenues and south to Colorado avenue, and a branch commencing at some point between Leavitt street and California avenue and north to Belmont avenue. An amendment will probably be passed requiring a deposit as a guaranty that the company will do the work as described in the ordinance. The company has already so many verbal consents of the property holders along Market street that it is confident that it will secure all the consents for the loop on that thoroughfare with a terminus at Madison street.

Everett & Monte Cristo.—The contractors have been able to advance the construction work on this line considerably during the settled weather which they have had for some weeks past. The tracklaying through Stillaguamish Cañon has reached the second crossing of the river, the first crossing being at Granite Falls. A bridge is now being erected over the river and construction work is going on near the snow line on the mountains. The railroad is being built by the Colby-Hoyt syndicate, of New York, which has purchased the controlling interest in the rich mines in the Stillaguamish region near Monte Cristo, Wash., and the railroad is being constructed to develop this region. The western division of the road between Everett and Snohomish, Wash., on Puget Sound, has just been opened for traffic. The line to Monte Cristo up the Stillaguamish River will be about 60 miles from Everett. The principal mines are at Silverton and Monte Cristo, those at the

latter point being the largest and most valuable, and at that town a large ore concentrator will be built and a smelter is now under construction at Everett.

Great Northern.—Work on the extension of the Park Rapids branch toward Leech Lake, Minn., is being pushed. A bill is now pending in the legislature—it has already passed the lower house—granting permission for building a line across Itasca State Park.

Indianapolis, Bloomington & Bedford.—Survey have been made for this road from Indianapolis, southwest, east of White River, through the counties of Marion, Johnson, Morgan (east of Martinsville), Monroe (via Bloomington) and Lawrence to Bedford, the length of the line being about 80 miles. The officers state that they expect to begin the work at once. The grades are less than 80 ft. to the mile, and the maximum curvature is six degrees. The erection of six 100 ft. spans will be necessary. Newell Sanders, of Chattanooga, is President, and Benjamin Thompson, of Bloomington, is manager.

Jackson.—This company has been organized at Jackson, La. The capital stock is $30,000, $15,000 of which is subscribed. The officers are: Frank Herr, President; G. H. Jones, M. D., Vice-President; C. D. Smith, Treasurer; Dr. P. H. Jones, Secretary. The object of the organization is to build a road to a connection with the Yazoo & Mississippi Valley road.

Kentucky Central.—Thomas Woods, of Covington, Ky., has the contract for a short branch to connect this road with the Louisville & Nashville bridge across the Ohio River at Cincinnati. The surveys for the new line have been made from a point near the station at Milldale, Ky., making a junction with the Louisville & Nashville near the Licking River crossing. It is said that the trains of the Kentucky Central will enter Cincinnati over the tracks of the Louisville & Nashville through Newport and to the Butler street station instead of running over the Chesapeake & Ohio bridge into the Grand Central Station.

Kettle Creek.—About 800 men are now at work constructing this line, which, when completed, will extend to Cross Forks, a point about six miles above Hammersley's Forks, Pa. It is probable that the road will be extended still further down the creek, and will open up rich fields of coal and fireclay that have heretofore been unmarketable.

Little Kanawha Valley.—There has been considerable agitation along the route through which this road is projected to extend (Parkersburg, W. Va., to the headwaters of the Little Kanawha River) during the past two months on the question of local aid to the enterprise. The counties and districts are all favorable to the issuing of bonds, and Parkersburg business men have promised substantial aid. Preliminary surveys have been made.

Manistique & Northwestern.—This line has been surveyed and located from Manistique, Mich., to the Cambria Iron Mines, about one mile west of Negaunee, Mich., a distance of 91 miles. The entire line is through an undeveloped country, all heavily timbered with pine, spruce, cedar, hemlock, sugar, maple and elm. No towns along the line except at the two terminal points, viz.: Manistique, on the north shore of Lake Michigan, and Negannee, a city located in the iron region. No portion of the road has been let to contractors, but probably soon will be. W. H. Hill is President, J. D. Mersereau, Treasurer; H. Duval, Secretary, and S. H. Beardslee, Chief Engineer, all with offices at Manistique, Mich.

Missouri, Kansas & Texas.—The first through freight train on the new line into Houston, Tex., was run on April 10, and it is announced that freight trains will be run regularly hereafter. The line will be ballasted so that passenger trains can be put on before the end of the month. The new line into Houston is practically an extension of the old Taylor, Bastrop & Houston road, the eastern terminus of which has been at Boggy Tank for some years. About 70 miles of new road was built east from that point to reach Houston.

Mount Pleasant & Seaview City.—This project has recently been revived and the contract has been let to the American Bridge & Iron Company, of Roanoke, Va., for building the bridge to connect Hog Island in Charleston harbor with Mount Pleasant. The railroad which it is proposed to build will be nine miles long and will connect Hog Island with Seaview City. A ferry will be run between Charleston and Hog Island.

Mount Vernon, Bayview & Northern.—Superintendent W. J. McKenna, of Bayview, Wash., states that he expects to complete the road this summer and will have work commenced at once on the clearing of the right of way. The road is to extend from Mount Vernon to Edison, Wash., on the Samish River, about 15 miles.

Neuse & Swansboro.—J. A. Pittman reports that a survey will soon be made for this road which will extend from Swansboro northeast to Riverdale, on the Atlantic & North Carolina road, a distance of 25 miles. J. J. Hines, of Riverdale, is the chief projector.

Nevada Southern.—It has been decided to extend this road from the New York mining district, in San Bernardino County, California, to Good Springs, Nevada. It has been suggested that the line might be continued via Las Vegas and West Point to Pioche, Nev. Along the proposed route are extensive coal and iron deposits, besides valuable gold and silver mines and some fertile valleys. The company has received an offer on $1,500,000 of its bonds, which will probably be accepted.

New Roads.—The Caldwell Land & Lumber Company, of Lenoir, N. C., proposes to build a road from Lenoir through Caldwell County to the company's timber lands on Wilson's Creek, about 30 miles, and it is said that the contracts will be let shortly.

Norfolk & Western.—The branch lines up the North Fork River, in West Virginia, and those to reach coal mines in the vicinity will be completed in a few weeks. The grading is all done, having been completed last week by Rogers & O'Brien, of Norfolk, Va. The main branch is five miles long, and with the short lateral branches will reach the nine mines, which are nearly ready to begin shipments. The company has also commenced upon a four mile spur from the Ohio River extension to a large coalfield, which it can reach and develop at comparatively small expense. The work was begun last week, 200 negroes being put on the grading.

Northeastern Elevated.—Common Pleas Court No. 3 last week continued the injunction granted on the application of North Front street property owners, against the Elevated Railroad to restrain the company from erecting its proposed elevated railroad in Philadelphia.

Oscawana & Cornell.—A mortgage for $250,000 for a period of 10 years in favor of the State Trust Company of New York has been recorded in Westchester County. Surveys have been made for this line from Oscawana, N. Y., to stone quarries near the site for the proposed Croton aqueduct dam, about five miles, and it is reported that some construction work is now going on near Oscawana. W. H. Gale, of 44 Pine street, New York city, is President.

Pennsylvania.—A contract has been awarded for the grading work for the extension of third and fourth tracks on the Philadelphia Division of the Pennsylvania road, between Frazer and Coatesville, Pa., a distance of 4 5 miles. Contracts have been awarded to B. B. Gonder and C. N. Stark for the extension of fourth track on the Philadelphia Division at Atglen, Witmer and Christiana. Contracts have been awarded to James McGraw, Drake, Stratton & Co. and P. McManus for the laying of third and fourth tracks on the Middle Division between May's Bridge and Manayunk Bridge, a distance of about 15 miles.

Pennsylvania Central.—This road, which was chartered a year or so ago to build from a connection with the Philadelphia & Reading system at White Deer, near Williamsport, through Bellefonte to White Hall, 60 miles, has been reorganized, with the election of Walter L. Ross, President, S. H. Hicks, Vice-President, and W. J. McHugh, Secretary and Treasurer, all of Philadelphia. When the company was first organized there was a contract entered into by the Philadelphia & Reading, by which the latter road guaranteed the interest on the bonds. This contract has been abrogated. Work on the new line will, it is stated, begin at once.

Philadelphia, Wilmington & Baltimore.—The Delaware Legislature has recently passed a bill empowering the Delaware Railroad, one of the operated lines of this company, to build a branch from Middletown northwest to the state line in the direction of Elkton, Md., the distance to that town being about 15 miles.

Pittsburgh, Cincinnati, Chicago & St. Louis.—Seven miles more of the double track of this line, from Jewett, O., to Miller's Tower, O., was completed last week and put in use. This makes 32 miles of second track now in use between Denison and Steubenville, O., besides five miles of new sidings.

This company's New Cumberland, W. Va., extension is being pushed vigorously since the opening of spring. The large trestles over Dry Run and at Mahan's have been completed, and the one at Nesley's is nearly done. As soon as this piece of work is completed, the roadbed will be ready for the rails as far as the Narrows, opposite Wellsville, O. Track laying on the lower end of the road will begin next week.

Pittsburgh, Ohio Valley & Cincinnati.—The current newspaper reports that work is likely to be commenced this spring on the extension to Marietta, O., are denied by the officers of the company, who state that no extension of any kind is contemplated at the present time.

Portland, Monterey & Gulf.—John Willacy, General Manager of the road, is now engaged in securing the right of way south of Victoria to Sharpsburg, Tex., his headquarters being at Victoria. The distance to Sharpsburg is over 30 miles, and the contracts for grading to that point, the first section of the road, have been let to J. H. Barrett and Mr. Willacy.

Portland & Rumford Falls.—Work was commenced last week on the Auburn or eastern end of the extension now building from Mechanic Falls, Me. The work is now going on near Hackett's, where the new road will intersect the Maine Central. John Barry is the contractor for the new road, which will be 12 miles long, from Mechanic Falls to the Maine Central.

Sandusky & Columbus Short Line.—The formal opening of the line has been postponed until April 17 when it is announced that regular through trains will be put on between Sandusky and Columbus, O., a distance of 110 miles.

Sioux Falls, Yankton & Southwestern.—There are now 800 teams at work grading this line, and tracklaying will be begun on May 1. All the bridges are completed except the one across the Big Sioux River.

South Brooklyn Terminal & Railroad Company.—This company has instituted proceedings in the New York Supreme Court to fix the crossings of streets and avenues in its contemplated extension from Ninth avenue and Thirty-ninth street, through New Utrecht, Flatbush and the Twenty-sixth Ward to Jamaica. It is understood that the Terminal company has entered into arrangements with the Brooklyn & Brighton Beach Railroad to connect with its road to Coney Island, making a new route from the Thirty-ninth street ferry, Brooklyn, to the seaside. The railroad proposes to build undergrade crossings at some of the principal avenues, but the plans propose numerous grade crossings, and there is much opposition to such crossings. The extension proposed is through a well populated district near Brooklyn, and many of the towns will probably be soon included in the corporate limits of the city of Brooklyn.

Texas Central.—The stockholders met at Waco, Tex., on April 8 and approved the plan for issuing new bonds to the amount of $2,000,000, the proceeds of which are to be used in paying off the present indebtedness, making various improvements and for the proposed extensions to the Thurber coal mines and into Waco, Tex.

Texas, Sabine Valley & Northwestern.—The extension of this line to Centre, Tex., is now being located by the Chief Engineer, William Bradburn. The Texas Construction Company, whose New York office is at 15 Wall street, is building the line and will probably let the sub-contract shortly, so that work can be begun this spring. The grading will be light, averaging 16,000 yards of excavation a mile, the soil being clay and sand. The maximum grade is 52.8 ft. to the mile, and the curves three degrees. The extension will be about 30 miles long from Carthage southeast via Tenaha to Centre, Tex., the first two miles from Carthage being already completed. R. J. Evans, of Longview, Tex., is the General Manager.

Ulster & Delaware.—The directors of the railroad are reported to have under serious consideration the extension of the Delaware & Otsego from its present terminus at Bloomville to Davenport Centre, N. Y. This road was recently leased by the Ulster & Delaware. Davenport Centre, which is about 12 miles from Bloomville, is the terminus of the Cooperstown & Charlotte Valley Railroad, which is operated to Cooperstown. Work will probably be begun on this extension in a short time. When this connection is made the Catskill Mountain resorts will be in direct communication with Cooperstown.

Weatherford, Mineral Wells & Northwestern.—A party of engineers began a survey last week for an extension northwest of Mineral Wells, Tex., the present terminus of the road. The work is in charge of T. A. Hammond, Chief Engineer. The objective point of the present survey is not published, and there seems little prospect of any early construction work.

Western Maryland.—The work of grading the York extension of the Baltimore & Harrisburg branch has been completed as far as West York Station, Pa., ready for the ties and rails.

West Virginia & Pennsylvania.—Two corps of engineers, said to be in the employ of the Pennsylvania Company, have been at work for two weeks making surveys along the east side of the Monongahela River, the same route controlled by the West Virginia & Pennsylvania, mention of which was made in the *Railroad Gazette* two weeks ago. One corps has reached Lock No. 8, and has returned to make a location along that part of the line. Another corps has made a location from Brownsville up to the lock. These same engineers have been doing some work on the west side of the river, and have covered the line on that side from Lock No. 9 down to Dunkard, Pa.

Wilkes-Barre & Eastern.—It is stated that the viaduct at Panther Creek in Lackawanna County, Pa., cannot be completed before next fall, although all the other work will be ready for trains about July, rails being now laid at the Stroudsburg or eastern end of the road. This viaduct is to be 150 ft. high and 2,000 ft. long.

GENERAL RAILROAD NEWS.

Bellaire, Zanesville & Cincinnati.—On April 5 the County Commissioners of Muskingum County, Ohio, offered for sale at the county seat, Zanesville, nine miles of the narrow gauge railroad of this company, lying in Muskingum County and owned by that county. The sale was for the purpose of relieving the road from any embarrassment that might result from the county owning an undivided interest in the property, and so that one of the several companies which have been negotiating for the control of the line with a view of making it a standard gauge and continuing it to the Ohio river might complete the arrangement without hindrance. There were two bidders, President George W. Saul of the Cleveland, Akron & Columbus, and Col. S. L. Mooney, President of the Bellaire, Zanesville & Cincinnati, acting in the interest of the Columbus, Shawnee & Hocking. Mr. Mooney's bid was $25,000 and Mr. Saul's $30,500. The commissioners held the bids under consideration till Friday, when it was decided that the interests of the county would be best subserved by the Columbus, Shawnee & Hocking Co., and its bid, though $5,500 lower than the other, was accepted. Mr. Mooney has said that the company he represents will commence within the next few months to build a connecting line from its present terminus to Zanesville and to make the newly purchased road standard gauge, thus securing an outlet to the Ohio river at Bellaire, O.

Charleston, Cincinnati & Chicago.—Cincinnati capitalists have purchased from the Finance Company of Pennsylvania the control of this road. The Finance company owned over $2,000,000 worth of the railroad company's bonds, and bought the road itself some years ago for self-protection at a foreclosure sale, the proceedings of which had been instituted by contractors for construction work. It is understood that the scheme of the Cincinnati purchasers includes the formation of a new company and the completion of the railroad, the new capital required to be furnished by the syndicate. The bondholders, in return for their surrender of railroad securities, will receive securities in the new corporation. The Investment Co. of Philadelphia owns $1,000,000 of these bonds, and the Cincinnati syndicate have made an offer for the purchase of the bonds, similar to that made to the Finance Co. Samuel Hunt, of Cincinnati, is one of the purchasers.

Chattanooga Southern.—The foreclosure sale of this road, which was to have occurred at Atlanta on May 7, has been postponed until the property can be readvertised, owing to some defect in the present proceedings. The foreclosure sale will be at Gadsden, Ala., and the date will be decided by the special master. The petition of John Byrne and other bondholders of New York for a postponement of the sale was denied last week by Judge Newman, but though their petition was denied, the postponement is necessary.

Cleveland, Canton & Southern.—At a meeting of the stockholders held March 29, it was voted to issue as many shares of first-class preferred stock as there are shares of the present preferred stock. The present preferred stock can be exchanged for the new stock, share for share, upon payment to the company of $10 per share with each share of preferred stock so offered for exchange before May 1. It is expected to raise by this method over $800,000, for new equipment, side tracks and other improvements.

Cleveland, Cincinnati, Chicago & St. Louis.—The stockholders of the company will be asked to vote at a special meeting to be held May 10 on a proposition to issue a consolidated mortgage for $50,000,000 in order to provide funds for betterments and for the redemption of outstanding bonds as they mature. In his circular requesting the consent of the stockholders to the issue President Ingalls says: "It is necessary to provide, at junction points, commodious yards, shops and roundhouses, and owing to increased business upon certain divisions to furnish additional terminals, sidings and some sections of double track. The directors have recently purchased 60 locomotives and wish to contract at once for 50 more. Fifty new passenger cars have been ordered, and a large number of freight cars. It is necessary to put in short sections of double track, and a large amount of passing sidings in the immediate future, especially on the divisions which will be crowded with business during the World's Fair. It is thought advisable by your directors to make a mortgage on all the property of the company to secure not exceeding $50,000,000 bonds, running 100 years and bearing interest at not over five per cent. as the directors may determine, principal and interest to be payable in gold; about $29,000,000 of these bonds, being the amount of bonds now outstanding on the various lines (exclusive of those on the Cairo division, the Peoria division, the Michigan division, and the St Louis division west of Terre Haute), to be reserved for the redemption of said outstanding bonds, a considerable amount of which will mature in 1899, and

the remainder at various dates over a period of years. The object in making the new mortgage is to provide for the present and future construction and equipment requirements of the company. It is therefore proposed that $5,000,000 of the new bonds (to bear four per cent. interest) shall be sold and their proceeds used to cover outlays for the construction and additions already made or in progress, or which may be undertaken during this and the next fiscal year; and that the remaining bonds shall be issued only for like additions thereafter to an aggregate not exceeding $1,000,000 in any one fiscal year. While the earnings have decreased largely during the winter months just passed, the decrease is due to special causes, which your directors believe to be only temporary. The gross earnings of the company for the calendar year 1892, not including the Peoria Division, which is operated separately, were over $14,800,000. It is believed by your directors that, after the improvements now under consideration are completed, the road can be operated on a basis of not over 70 per cent.

East & West of Alabama.—The foreclosure of this railroad, which was to have taken place on April 10, has been postponed one month by Judge Pardee, of the United States District Court, in which the litigation effecting the railroad is pending.

Great Northern.—The approximate gross earnings for the month of March are shown in the following statement:

	1893.	Inc. or dec.
St. P., M. & M. leased lines	$1,077,604	D. $208,386
Eastern Ry. of Minn	69,265	D. 2,019
Montana Central	104,461	I. 17,106
Total for system	$1,251,331	D. $193,298
Nine months, July 1 to March 31:		
St. P., M. & M. leased lines	$10,777,688	I. $421,743
Eastern Ry. of Minn	1,078,977	I. 123,521
Montana Central	936,485	D. 24,771
Total for system	$12,763,151	I. $520,493

Houston & Texas Central.—In pursuance of the order of Judge McCormick, of the United States Circuit Court, the railroad was taken out of the hands of Receiver Dillingham on April 10 and turned over to the purchasers, represented by Thomas H. Hubbard, of New York, as President.

Jacksonville, Tampa & Key West.—Judges Pardee and Swayne, of the United States Court, issued a decree at Jacksonville, Fla., on April 10, in the receivership case, making James H. Durkee Receiver, thus setting aside orders made April 7, by which a previous decision of the Circuit Court was affirmed and R. B. Cable was restored to the receivership and Mason Young deposed. Young and Cable are each so closely identified with the opposing parties of stockholders that it was decided to appoint a receiver not identified with either interest. The receivership includes only the trunk line property. The Florida Southern Division and the St. John's & Lake Eustis road, as well as the Indian River Steamboat Co., retain their separate management under their own stockholders.

Louisville, New Albany & Chicago.—At a meeting of stockholders at Indianapolis, April 12, the issue of $4,000,000 of preferred stock was authorized.

New York, Chicago & St. Louis.—A special meeting of the stockholders will be held at Cleveland on May 3 to vote upon the approval of a contract by the company for the lease of the old Lake Shore & Michigan Southern line between Silver Creek and Dunkirk, N. Y., a distance of eight miles.

New York, Susquehanna & Western.—The directors of the company decided last week upon the terms of a consolidation with the Hudson River Railroad & Terminal Company. The latter company was organized in the interests of the New York, Susquehanna & Western for the purpose of constructing a tunnel through the Palisades to the Hudson River at Edgewater, near Weehawken. The stock of the consolidated company will be $26,000,000, of which $13,000,000 will be preferred. The present preferred stock of the New York, Susquehanna & Western will receive for every 100 shares $125 in cash and 120 shares in preferred stock of the new company, and the common is to be exchanged share for share for new common stock. For each 100 shares of the Terminal Company's stock will be given 20 shares of new preferred. The capital of the Terminal Company is $5,000,000, and the exchange of its stock will require $1,000,000 of the new preferred stock. When the plan is carried out there will still remain in the company's treasury $2,400,000 of preferred stock. The preferred stock of the New York, Susquehanna & Western is a six per cent. cumulative stock, and the unpaid dividends amount to about 55 per cent. In consideration of the terms on which the new stock is offered, the preferred stockholders will be asked to resign their claim for these unpaid dividends. The new preferred stock will be entitled to dividends only if earned, and will not be cumulative.

Ohio & Mississippi.—A majority of the securities of this company and of the Baltimore & Ohio Southwestern have been deposited in London and New York, and the proposed consolidation will be carried out immediately. It is expected that the consolidated company will assume control of the property on July 1. A meeting of the stockholders of both companies will be held shortly, and at that meeting a board of 13 directors will be chosen for the new company.

Sedalia, Marshall & Northern.—J. B. Quigley, of Sedalia, and Dwight Tredway, of St. Louis, have bought all the stock of the above company owning a narrow gauge line between Sedalia, Mo., and Warsaw, 43 miles, and it will no longer be operated as a branch of the Missouri Pacific.

Southern Pacific.—The company reports the gross earnings of its Atlantic system for February at $1,053,958, an increase of $42,370 as compared with the same month of last year, and net earnings $294,211, an increase of $43,645. The gross earnings of the company's Pacific system for February were $2,473,421, an increase of $64,132 as compared with the same month of last year, and net earnings $817,905, an increase of $14,384. The gross earnings of both systems for February were $3,527,379 an increase of $106,502, as compared with the same month of last year, and net earnings $1,112,116, an increase of $58,029.

Staten Island.—The first mortgage bonds, amounting to $300,000 and maturing April 1, will be replaced by a new issue, which will amount to $500,000 and bear 4½ per cent. instead of 7 per cent., as the old issue did. The $200,000 thus realized, it is said, will be spent in double-tracking the road its entire length, building new terminals at Tottenville and a new ferryboat. The company owns 13 miles of road leased to the Staten Island Rapid Transit Co.

Texarkana & Fort Smith.—The petition of J. H. Bemis, asking to have the railroad placed in the hands of a receiver, on trial before the State District Court at Boston, Tex., was disposed of April 6. Bemis claimed that the road owed him $150,000 for funds and supplies advanced to construct its line, and in his petition asking for a receiver he alleged the road to be insolvent, which charge is denied by the company. The court holds that Bemis holds a large but undefined interest in the road, and, pending appeal to a higher court, to determine the amount of that interest, orders that the Missouri, Kansas & Texas Trust Co., the new owners, file a bond for $200,000. The petition for a receiver was then withdrawn.

West Jersey.—The Directors have authorized an allotment of 25 per cent. of the capital stock, amounting to over $500,000. This stock is to be issued at par. Out of the money received the company will pay to the Pennsylvania $285,000, which that company has loaned to the West Jersey, and, of the balance remaining, improvements to the roadbed, betterments and rolling stock will be made.

TRAFFIC.

Traffic Notes.

Interstate Commerce Commissioners Morrison, Knapp and Clements are holding inquiries at various Southern cities.

The Southern Pacific and Atchison, Topeka & Santa Fe have made a traffic contract on transcontinental business.

The United States Express Company has renewed for five years its contract with the Central Railroad of New Jersey for the express business on that road.

The American Express Co. has secured an injunction to prevent the officers of the New York & New England and the United States Express Co. from interfering with its express traffic on that railroad.

The Committee on Railroads of the Massachusetts Legislature has begun its investigation in Boston of the charges that the New York, New Haven & Hartford Railroad had discriminated against the New York & New England, to the injury of Boston merchants.

To accommodate people traveling from the city to the country the Philadelphia & Reading has arranged for the transportation as baggage of children's cribs, folding chairs, invalid chairs, oil or gas stoves, typewriters and other articles of the character that passengers leaving the city for the summer are likely to take with them. Such articles can be checked as ordinary baggage.

The Colorado Midland announced on April 3 reduced passenger rates from Denver to Aspen, Glenwood Springs, Grand Junction and intermediate points. The rate will be $8 from Denver, Colorado Springs and Pueblo to Aspen, and $12 to Grand Junction. The reduction amounts to about $5 between Denver and Grand Junction. By the same order the Midland takes off its through night passenger trains No. 2 and No. 3.

The New York Central has issued revised regulations for the sale of clergymen's tickets. The order or permit, which, it appears, is also adopted by all the Vanderbilt roads and by the Boston & Albany, in the same form, is granted also to Sisters of Charity and members of the Salvation Army. It provides for half fare between the principal stations on the Central, but to and from smaller places the rate is 1½ cents a mile, which is about three-quarters the regular rate on the main line of the Central. No reduction will be made on trips of less than 25 miles. The order must be shown to gate tenders and conductors as well as when buying the ticket.

The following is the legislation of the Joint Committee now in force relating to the fares to be charged and the conditions to be observed as to tickets sold on account of the World's Columbian Exposition.

1. Round-trip continuous train tickets to Chicago and return may be sold at Eastern points on and after April 24 to and including Oct. 29, 1893, for all regular passenger trains scheduled at 35 hours or less between New York and Chicago, at the current limited tariff fares.

2. On trains scheduled at more than 35 hours between New York and Chicago in each direction, round-trip tickets may be sold at 20 per cent. reduction from the current first class limited tariff fares by the route or routes traveled, and such tickets will entitle the holders to usual sleeping and parlor car privileges.

3. Subject to the above conditions, each line may sell tickets either at tariff fares or at the 20 per cent. reduction therefrom, good going and returning by its own road, and good going via its own route and returning by any other line, but the consent of such return line must be first obtained.

4. When round-trip tickets are sold to Chicago by one route good to return via another, the round-trip fares shall be the sums of the westbound and eastbound rates by the two routes designated on the tickets.

5. The special tickets of the several lines shall be uniform in character as far as practicable. Each company is required to prepare a ticket showing the local conditions it requires observed and submit a copy of the same with necessary explanations to the representatives of each line in the territory of the Joint Committee.

6. No stop-over privileges will be allowed upon any class of tickets except those sold at unlimited fares.

7. The extreme limit of return tickets at their final destinations will be Nov. 15, 1893.

8. The sale of party rate tickets in any way that will affect the foregoing agreed through rates on World's Columbian Exposition traffic is discontinued from April 15 to October 30, 1893.

9. All tickets except those sold at unlimited fares shall be for continuous trains only; this term being understood to mean trains which connect directly with each other.

Chicago Traffic Matters.

CHICAGO, April 12, 1893.

The managers of the Western Passenger Association were in session nearly all last week, and resumed their deliberations yesterday. After deciding that there should be a trans-Missouri division of the Association instead of maintaining an independent association for that territory, they re-elected Chairman Caldwell and extended his jurisdiction over the territory. Questions affecting business purely local to each division will be settled in that division, and all matters affecting traffic embraced in both divisions, or passing from one division to the other will be under the jurisdiction of the Chairman, as will also all disputed questions arising in either division.

At the Wednesday meeting the Western Passenger Association Committee completed the consideration of the different articles of the new agreement and reported to the meeting of the managers Thursday.

The Central Traffic Association managers at a meeting last week confirmed the action of the Joint Committee at New York regarding fares for the Exposition.

The question of the entire abolition of passenger commissions in Central Traffic territory as agreed by the Joint Committee has been agreed to by the Central Traffic lines, subject to the concurrence of the Chicago and Ohio River lines.

The announcement made by the Burlington that they proposed shortening the time for their passenger trains between here and St. Paul, at one time seriously threatened to interfere with the successful reorganization of the Western Passenger Association and the adoption of any uniform rules and fares for Exposition traffic. A meeting of the managers of the Western lines was held April 8, and after considerable discussion the Burlington agreed to give up its fast train service and join the other lines in lengthening out the time somewhat between Omaha and Kansas City and Chicago. The arguments which brought about this agreement were that the trains now scheduled were carrying all the cars they could and make the schedule time, and that, in view of the fact that the equipment of the lines was sure to be taxed to its utmost, it was advisable to lengthen out the time, thus permitting of the hauling of more cars to each train.

The Central Traffic lines have agreed to the following round trip rates for the World's Columbian Exposition:

From Columbus, O.	$12.50	From Indianapolis	$8.00
" Cincinnati	12.00	" Evansville	13.85
" Louisville	12.00	" Vincennes	11.35
" Hamilton	11.50	" Terre Haute	8.60
" Dayton	11.50		

The arguments of counsel in the case pending before Judges Tuthill, McConnell and Dunne, in which the attorneys for the indicted ticket brokers seek to secure the release of their clients on *habeas corpus* proceedings, were concluded Monday.

Another notice has been issued to connecting lines and ticket agents and ticket sellers signed by Chairman Walker and Commissioners Goddard and Blanchard of the Joint Committee, confirming the notice effective March 17 announcing the discontinuance of the payment of passenger commissions from Chicago and St. Louis, and extending the order to Louisville and Cincinnati effective April 1. The notice is issued on behalf of the following lines: Baltimore & Ohio, Baltimore & Ohio Southwestern, Chicago & Erie, Chicago & Grand Trunk, Big Four, Chesapeake & Ohio, Cincinnati, Hamilton & Day on, Lake Shore & Michigan Southern, Louisville, Evansville & St. Louis, Louisville & Nashville, Michigan Central, Nickel Plate, Ohio & Mississippi, New York, Lake Erie & Western, Pennsylvania, Clover Leaf, Vandalia and Wabash, as initial lines; and in addition the Central Railroad of New Jersey, Delaware, Lackawanna & Western, Grand Trunk, New York Central & Hudson River, New York, Ontario & Western, Pennsylvania Co., Philadelphia & Reading and Lehigh Valley and West Shore—Eastern connections. The agreement reads as follows:

"At meetings held in New York City on Feb. 24, 1893, and in Cincinnati on March 17 and 18, 1893, it was agreed by the Presidents of the several lines named below that on and after April 1, 1893, said lines will not reduce properly authorized passenger fares by any form of concession whatsoever, or pay, share or allow for their several lines east of Chicago, St. Louis, Louisville and Cincinnati the whole or any part of any form of commission or other allowance for or in connection with the sale of east-bound tickets, wherever issued, reading from or through either of these points, or intermediate gateways, to the Western termini of the Trunk Lines and all points east thereof.

"You are therefore notified that no commission payments or other allowances will be made contrary to this agreement after March 31, 1893."

The following exceptions are noted:

"The Wabash line west of the Mississippi River and between St. Louis and Chicago is not included in this notice.

"The Grand Trunk and Chicago & Grand Trunk railways and Wabash Railroad reserve the right to meet the competition of the Canadian Pacific as to commissions, if any, paid on traffic from and through St. Paul, Minneapolis and Duluth via Toronto and Montreal, on which the latter company pays commissions for its route via Sault Ste. Marie.

"The Grand Trunk Railway Company reserves the right to meet the competition of the Canadian Pacific as to commissions, if any, paid on traffic from and through Chicago, via Toronto and Montreal, on which the latter company pays commissions for its lines east of Detroit River.

"The Louisville & Nashville Railroad Company, as to commissions, if any, paid on traffic originating in Southern points beyond Louisville, on which commissions are paid by other Southern lines, via Atlanta and other Southern gateways, or via Cincinnati, reserves the right to meet such competition for its line to the Ohio River at Cincinnati."

The shipments of eastbound freight, not including live stock, from Chicago, by all the lines for the week ending April 8, amounted to 70,370 tons, against 82,533 tons during the preceding week, a decrease of 12,163 tons, and against 89,878 tons during the corresponding week of 1892. The proportions carried by each road were:

Roads.	W'k to Apl. 8.		W'k to Apl. 1.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	7,982	11.3	8,826	10.7
Wabash	3,788	5.4	6,193	7.5
Lake Shore & Michigan South.	12,808	18.2	15,696	19.0
Pitts., Ft. Wayne & Chicago	9,923	14.1	8,252	10.0
Pitts., Cin., Chicago & St. Louis	6,829	9.7	8,194	9.9
Baltimore & Ohio	3,701	5.3	3,509	6.7
Chicago & Grand Trunk	10,344	14.7	10,711	13.0
New York, Chic. & St. Louis	5,888	8.4	7,537	9.1
Chicago & Erie	6,541	9.3	8,907	10.8
C., C., C. & St. Louis	2,556	3.6	2,708	3.3
Totals	70,370	100.0	82,533	100.0

Of the above shipments 8,743 tons were flour, 34,575 tons grain and millstuff, 4,307 tons cured meats, 10,778 tons dressed beef, 940 tons butter, 921 tons hides, and 6,195 tons lumber. The three Vanderbilt lines carried 37.9 per cent., the two Pennsylvania lines 23.8 per cent,